



**DESIGN**

**D13**

Mackintosh-Hemphill CO.

PIONEERING, ENGINEERING,  
and BUILDING

"Service" 1803-1924

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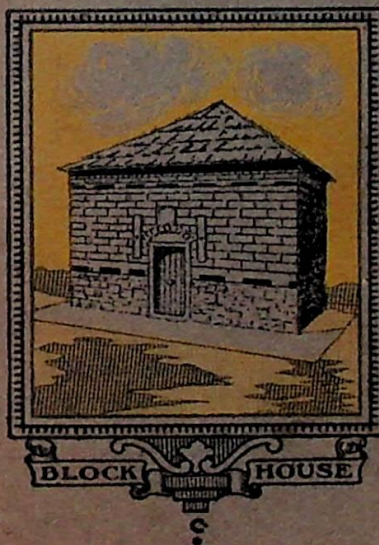


UNITED STATES PATENT AND

TRADEMARK OFFICE

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# PIONEERING ENGINEERING *and* BUILDING



"SERVICE"

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THIS booklet has been prepared with reference to the facts, both historical, and of an operating character, as we have found them. In distributing it, we seek to emphasize our past and present experiences and our ability to satisfy the most exacting conditions of service in all classes of Rolling Mill Construction and Equipment.

We pile so much material upon you that you have no time to read it. We serve you also for the purpose of learning more. We try to make many of our friends' work amount to in our

WE have so generally operated and helped us so often with timely suggestions and advice. We are fully appreciative of all of the assistance they have given us.

If this booklet was of the character to have a formal "dedication," we should feel it a pleasure, and a duty to dedicate it

TO  
THE ENGINEERS AND OPERATORS  
OF THE  
FERROUS AND NON-FERROUS  
INDUSTRIES

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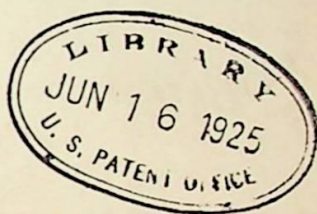
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# 1803-1924

## "OVER ONE HUNDRED AND TWENTY YEARS OF SERVICE"

PIONEERING • ENGINEERING  
BUILDING



*Actual Reproduction  
of 8" Cannon Balls cast in our Foundries  
for use by Perry's Fleet in  
War of 1812*



MACKINTOSH-HEMPHILL CO.

ESTABLISHED 1803 AT

PITTSBURGH, PA., U.S.A.

TS  
340  
M3



(1)  
JOSEPH McCLURG



(2)  
ALEXANDER McCLURG



(3)  
ABRAM GARRISON

- (1)—Founder of "Pittsburgh Foundry," 1803.
- (2)—His son, who with his father, founded "Fort Pitt" Works in 1815.
- (3)—Succeeded to ownership of "Pittsburgh Foundry" properties in 1836.
- (4)—Succeeded to ownership of "Fort Pitt Works" in 1878.
- (5)—Chief Engineer for eighteen years and chief lieutenant of Mr. Hemphill for many years; and a past President of Mackintosh-Hemphill Co. for twelve years.
- (6)—Prominently identified for fifty years with "Fort Pitt Works," serving successively as Treasurer, President and Chairman of the Board of Mackintosh-Hemphill Co.; now a member of the Board of Directors.



(4)  
JAMES HEMPHILL



(5)  
JOSEPH FAWELL



(6)  
PENNOCK HART

## FOREWORD

1803-1924



ONE-HUNDRED-AND-TWENTY YEARS OF SERVICE; in this case, FIVE GENERATIONS,—as it so happens that the Great-Great-Grandfather of the writer was the founder of this enterprise. It is a long time for one establishment to have endured in continuous service in an industry; especially, when that period is marked by such complete and radical changes and advancement.

The times of the Pioneer Iron Founder were brave days; they did much with their limited experience and with the tools they had at hand. These earliest days saw the use of "rule-of-thumb" methods and the "hodge-podge" of equipment. Only through the development of scientific methods and reliance upon such methods have the outstanding achievements of "modern industrialism" in the Ferrous and Non-ferrous metal industries within a half-century been made possible; Scientific methods in Chemistry; in Metallurgy, and in Mechanics. In 1860, when Cambria Iron Company installed "Captain" R. W. Hunt as Chemist, the Industry took a most significant step forward.

The faith of the Pioneer in spite of only partial successes and many a failure is an example for us all today.

Those of us who entered the Industry "at the close of an era"—the era of "Great Individualism"—a generation ago—had the privilege of knowing Abraham Garrison and James Hemphill, and many of the outstanding "Individualists" of their type. Men whose vision opened up a future of performance

THE WALL STREET JOURNAL,  
NOVEMBER 13, 1923--

### BY-THE-BYE in Wall Street

"The maker of Pittsburgh"—so Henry C. Frick called James Hemphill.

The premier builder of rolling mills and designer of steel plants would never have been thus named—not merely Pittsburgh but national industry inculcably the loser—had he been responsive to churning souls, sure that health was something chiefly to worry over. Counsellors contended that he was overtaxing physical strength.

Today was the day to Hemphill; alarm clocks did not police his mornings; not neighboring yawns dictate retiring hours; midnight often more than noon appealed to his constructive mind.

"But beside Carnegie is Hemphill comparable?"

"Mr. Carnegie was a magnificent opportunist," said Henry Frick. "Mr. Hemphill made opportunity. Do you know the story of Homestead?"

Greatest of America's steel octopuses, Homestead equalled combined the other deliveries that Mr. Carnegie made in his \$350,000,000 contribution to the founding of the United States Steel Corporation. James Hemphill conceived it, designed its mammoth superlatives, constructed it, equipped it, and sent for Mr. Carnegie—I follow Mr. Frick's first-hand knowledge—and said: "Andrew, take it. You can henceforth have no rival in the world."

Mr. Carnegie would discuss terms. He was checked. "Pay when and how you please," he was told. "You, Andrew, have the genius; Homestead gives you full field for it. You will profit yourself, you will be far further profiting Pittsburgh."

But the strength and the breadth of Mr. Hemphill was not reflected in generous stipulations—so Frick's narrative proceeded. He was a visionary—the vision seeing, vision harboring man, who knew that visions just had to come true if faith and work reached resolutely toward them.

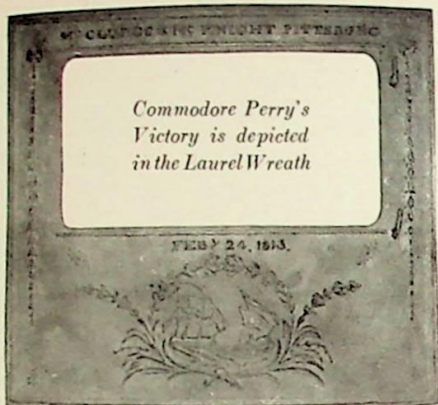
In projecting Homestead his dream was of putting America first. Europe had been insistent upon maintaining steel leadership. To Hemphill that dominance must be conquered; and his prescription was Homestead.

"At the very start"—Henry C. Frick's summation—"the doctors fell upon Hemphill. He was going too fast, working too intensely, rushing into nervous collapse by burning candles at multitudinous ends. He just had to halt, rest, look out for his own personal wellbeing. Hemphill didn't hear a single word of them. Then, suddenly, to their justification, if not confessedly to their gratification, came disclosure that the engineer's eyes were defaulting. Piercing pains, blurred sight—he had to admit handicapped him. Surrender? What Hemphill did was to go into a dark room, submit to physic and to bandages—and summon an extra retinue of lieutenants. He still had his ears, he could receive reports; he retained his voice, and orders didn't depend upon eyes. The giant plant went straight forward. And James Hemphill went—in the face of the kindest crew of disappointed folks that ever tried to be disheartening. He lived the perfect doer. Homestead is monument to persisting business nobleness."

Glimpse there of what may be meant by the saying. "Nothing can cement or insure your future except that which is within yourself"

—H. A.

## HISTORICAL REPRODUCTIONS



Above stove front cast in 1813 is in existence today



First Chilled Roll cast in 1823



Early Stencil used in shipping product



Our First Blooming Mill

Photograph taken in June 1924

No. 1 Blooming Mill Shoenberger Works,  
American Steel and Wire Company, Inc.  
built for Shoenberger &  
Company in 1877

### Drawings from Harley's Patent acquired by us

The inclined pipes give a rotary motion or swirl to the metal—the inception of the present method of casting with this special motion.



of untold proportions, as judged by their training and past experience. They engineered boldly; they builded well. In each effort the guiding principle was to make something more powerful; more advanced; more enduring. They sailed on an uncharted sea; the call of the Industries they served was always something new—something of design and capacity beyond the horizon of past experiences. In the din and roar of the mills today we see their products at work; still answering to the call for service.

James Hemphill achieved such successes in his contributions to the Iron and Steel Industry as have come to few men. Unpretentiously, he built a monument of great accomplishment. For many a day his judgment was the standard of measurement for rolling mill and engine construction and for mill problems. His wisdom, his kindly sympathy, were shared with his neighbor (the Iron-Master) for the asking. Mr. Frick calls him—"The Maker of Pittsburgh."

As the years have come and gone our several succeeding Masters and men have done their best in their turn to serve faithfully; else the oldest units comprised in our present organization would have long since passed out of existence. The recent accomplishments in our Engineering and Building, in number and importance, speak for themselves. Our organization is keenly alive to the responsibility of maintaining our position of "Master-builders." The teachings of experience, through accomplishment in producing all kinds and classes of mills, mill equipment and rolls, are recorded in our files and blueprints; a history of work well done.

This booklet should impress the reader with the quality and quantity of such work designed and built for the best men in the World's best mills in each succeeding generation.

Mackintosh-Hemphill Co. prize their record of early establishment and continued performance of their progressive predecessors. With such a background of service, they confidently look forward to a continued relationship of good will and understanding with their customers. The "Best" is none too good for them to produce and the "Best" is none too good to offer to their friends in the trade who have placed so much confidence in them as Engineers and Builders (as the records herein presented will show), so that they will continue to offer and produce—

*"The Best in Rolling Mill Machinery"*

MACKINTOSH-HEMPHILL CO.

J. RAMSEY SPEER, *President.*

## HISTORICAL REPRODUCTIONS

### NOTICE.

**T**HE subscribers, proprietors of the **PITTSBURGH FOUNDRY**, having dissolved Partnership by mutual consent, therefore all persons having demands against said firm, are desired to bring in their accounts for settlement, and those indebted are requested to pay their several accounts unto Joseph M'Clurg.

Joseph Smith,  
John Gormly,  
Joseph M'Clurg.

Pittsburgh, 28th October, 1805.

THE subscriber having purchased the Pittsburgh Foundry takes the liberty to inform the public that he intends immediately to commence and carry on said Foundry Business in the most extensive manner, where orders will be received and executed in the best manner by the public's most obedient and humble servant.

Joseph M'Clurg.

Pittsburgh, November 6.

St

Advertising found in  
the *Commonwealth* in  
1805 and 1806.

### PITTSBURGH FOUNDRY.

**J**OSEPH M'CLURG respectfully informs his friends and the public, that his **AIR FOUNDRY** is now in complete operation, where he will execute all kinds of **CASTINGS** in the best manner, as also machinery of whatever description, cast to any given pattern.

He also continues to carry on

The Manufactory of Tobacco,

And has now on hand a Quantity of

PLUG AND PIG TAIL TOBACCO,  
SEGARS AND RAPPEE SNUFF,

equal if not superior in quality, to any manufactured in the state, and lower in price than it can be brought here.

HE HAS LIKEWISE ON HAND,

A handsome & general Assortment  
OF GOODS,

Suitable for the present and approaching seasons.

ALSO,

A Large and General Assortment of  
NEW GENEVA

Window and Hollow Glass,

Of a superior quality, and at the Pittsburgh prices. Merchants descending the Ohio, and others, will find it to their interest to call on him.

February 12.

St

### PITTSBURGH FOUNDRY.

KINGSLAND, LIGHTNER AND CO

MANUFACTURERS OF

**CASTINGS OF ALL KINDS.**

**ALWAYS ON HAND**

STOVES,  
SAD IRONS,  
HOLLOW WARE,

GRATES,  
WAGON BOXES,  
PLOUGH CASTINGS,

&c. &c. &c.

Pittsburgh Foundry and Warehouse, corner of 5th and Smithfield sts.  
Warehouse, No. 75, Liberty st. at the old Jackson Foundry premises.

Advertising  
published in  
*Pittsburgh  
Directory*  
1837.

**M'CLURG, WADE & CO.,**

*Penn Foundry & Steam Engine Factory,*

**NORTHERN LIBERTIES,**

Warehouse No. 68, Front street, Pittsburgh.

## CHRONOLOGICAL DATA

1803-1922

- 1803 "Pittsburgh Foundry" founded by Joseph McClurg—later becoming "A. Garrison Foundry Co." (First Foundry in Pittsburgh).
- 1807 Joseph McClurg and his son, Alexander, form partnership.
- 1812 Cannon Ball furnished for Perry's Fleet.
- 1813 McClurgs and McKnight partnership formed.
- 1815 "Fort Pitt Works" established by Joseph McClurg and Alexander McClurg ("Mackintosh and Hemphill Co. Ltd.," successors).
- 1823 First Chilled Roll produced West of Allegheny Mountains in our foundry.
- 1830 "Pittsburgh Foundry" merged with "Jackson and Eagle Foundries."
- 1835 First Chilled Roll Patent issued to James Harley and acquired by us.
- 1836 Abram Garrison first identified with this enterprise.
- 1837 Calvin Adams established foundry, later S. Jarvis Adams Co. ("Pittsburgh Iron and Steel Foundries Co.," successors).
- 1841 Important United States munition contract for ordnance awarded to us.
- 1842 Our first Chilled Roll for rolling sheet brass—first produced in United States.
- 1850 First Locomotive built West of Alleghenies at "Fort Pitt Works."
- 1856 James Hemphill establishes Machine Shop near 16th Street, Pittsburgh.
- 1859 James Hemphill, Dr. W. S. Mackintosh, and N. F. Hart acquire small shop at 12th and Pike streets, Pittsburgh.
- 1860-4 Ordnance of all kinds made at all plants for Civil War.
- 1865 A. Garrison & Co. succeed to ownership of old "Pittsburgh Foundry."
- 1866 Two engines built for J. Painter & Sons (Carnegie Steel Co.).
- 1867 Vertical Blast Engine for Shoenberger & Blair (American Steel and Wire Co.).
- 1868 Plate Mill built for Singer-Nimick & Co. (Crucible Steel Co. of America).
- 1870 Guide Mill built for Akron Iron Co.
- 1871 Universal Mill built for American Sheet and Boiler Plate Co.
- 1871 Billet Mill built for Kimberley Carnes Co.
- 1871 Merchant and Bar Mill built for Howard Iron Works.
- 1871 Vertical Blast Engine built for Isabella Furnaces (Carnegie Steel Co.).
- 1871 Vertical Blast Engine built for Lucy Furnaces (Carnegie Steel Co.).
- 1873 Vertical Blast Engine built for Edgar Thomson Steel Works (Carnegie Steel Co.).
- 1875 Zinc Mill built for Mineral Point Zinc Co.
- 1876 Tin Foil Mill built for E. H. Peck.
- 1877 Blooming Mill built for Shoenberger & Co. (American Steel and Wire Co.).
- 1878 James Hemphill and partners acquire "Fort Pitt Works" to take care of increasing business.
- 1878 Simple twin geared Reversing Engine built for Roane Iron Co.
- 1880 Horse Shoe Mill built for Shoenberger & Co. (American Steel and Wire Co.).
- 1881 Copper Mill built for Detroit Copper and Brass Rolling Mills Co.

# HISTORICAL REPRODUCTIONS

## THE PITTSBURGH DIRECTORY FOR 1815.

CONTAINING THE NAMES, PROFESSIONS  
AND RESIDENCE OF THE HEADS OF  
FAMILIES AND PERSONS IN  
BUSINESS IN THE

BOROUGH OF PITTSBURGH,

WITH AN

### APPENDIX

CONTAINING A VARIETY OF USEFUL  
INFORMATION.

PITTSBURGH.

PRINTED FOR JAMES M. RIDDLE,  
COMPILER AND PUBLISHER, 1815.

### APPENDIX.

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#### A STEAM ROLLING AND SLITTING MILL,

Owned by Messrs. Whiting & Co. also machinery for cutting and heading nails.

#### A STEAM PAPER MILL,

Owned by R. Patterson & Co. in which great quantities of excellent paper are made, and of all varieties.

#### A STEAM COTTON FACTORY,

Owned by Mr. J. Jelly, on Watt's plan.

#### A STEAM TULLING MILL,

Owned by James Arthurs—the engine improved plan, by a son of Mr. Arthurs.

#### STEAM BOATS.

Four Steam Boats have been built in New Orleans, Vesuvius, Atna, and besides one lately launched and another on the stocks.

#### AIR FOUNDRIES,

There are three Foundries in Pittsburgh and one in Birmingham, at which castings of every description, from a cannon to a spider, are extensively and handsomely executed. In connection with the Foundry of Messrs. McClurg & McKnight, is a mill for boring Cannon.

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### MCCL-MCK

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McClurg John, sailmaker and boat-builder, Water above Grant

McClurg Joseph Senr. gentleman, residence between Market and Ferry

McClurg Joseph Junr. air foundry, residence 5th between Wood and Smithfield

McClurg & McKnight, air foundry, corner of 5th and Smithfield

was first laid out in 1765, and afterwards laid out and surveyed, on its present plan, in 1784.

The ground plot of the town is triangular, the streets running parallel with each river, which at their junction form an angle of about 53 degrees.

The population in 1800 was about 3,400 souls—in 1810 the census gave 4,740, and in 1815, a calculation founded on what is believed to be correct data, makes an estimate of upwards of 9,000. This great increase of population is to

Few places can boast of more useful improvements in manufactures and the mechanical arts than Pittsburgh—it has been justly and emphatically styled "The Birmingham of America." A comparative view of its progress must indeed awaken admiration. Until about the year 1793 its increase was not rapid—in the year 1815 we behold it rich and flourishing, daily augmenting in manufactures and commerce.

Interesting data, listings and references referring to our earlier organization.

# CHRONOLOGICAL DATA—Continued

- 1881 Simple twin direct-connected Reversing Engine built for Union Mills (Carnegie Steel Co.).
- 1882 Sheet Bar Mill built for Aetna-Standard Iron Co. (American Sheet and Tin Plate Co.).
- 1884 Structural Mill built for "Pittsburgh Bessemer Steel Co." (Carnegie Steel Co.).
- 1884 Wire Rod Mill built for Oliver Roberts Wire Co. (American Steel and Wire Co.).
- 1885 Rail Mill built for Union Mills (Carnegie Steel Co.).
- 1886 James Hemphill and William Garrett patent issued for Rod Mills.
- 1886 Lead Mill built for Bailey Farrell & Co.
- 1887 Copper Rod Mill built for Ansonia Brass and Copper Co.
- 1888 Brass Mill built for Chicago Brass Co.
- 1888 James Hemphill and Joseph Fawell patent issued for Universal Mill construction.
- 1890 James Hemphill and Joseph Fawell patent issued for Universal Mill construction.
- 1892 Two pairs Duplex Tandem Compound Bessemer Blowing Engines built for National Tube Co.
- 1893 Aluminum Mill built for Pittsburgh Reduction Co.
- 1894 Corliss Engine built for Star Tin Plate Co. (American Sheet and Tin Plate Co.).
- 1897 Cross Compound Corliss Engine built for Monongahela Tin Plate Co.
- 1899 Continuous Rod Mill built for Page Woven Wire Fence Co.
- 1900 Joseph Fawell and J. E. Schwab patent issued for Roll-changing device.
- 1901 Joseph Fawell patent issued for Valve Gear improvements.
- 1901 Joseph Fawell patent issued for Roll-balancing device.
- 1902 Three Horizontal Cross Compound Corliss Blast Engines for Sharon Steel Hoop Co.
- 1907 Twin Tandem Compound Reversing Engines built for Jones & Laughlin Steel Co.
- 1907 The S. Jarvis Adams Co. built extensive foundry at Midland, Pa.
- 1909 Joseph Fawell patent issued for Manipulator improvements.
- 1910 Joseph Fawell patent issued for Manipulator improvements.
- 1913 "Adamite" patented in the United States and foreign countries—the first successful patented alloy for rolls and heavy duty castings.
- 1916 "Woodard Machine Co." established at Wooster, Ohio, by Mackintosh-Hemphill Co.
- 1917 Our Universal Coupling patent issued.
- 1917 United States Court of Appeals for the Third Circuit sustains validity of "Adamite" patent.
- 1922 Merger of A. Garrison Foundry Co., Pittsburgh Iron and Steel Foundries Co., Woodard Machine Co. with Mackintosh-Hemphill Co.

NOTE—In preparation of the foregoing data, we have found such scant records as to the products of the earlier part of our history that, for the sake of accuracy, we have made no attempt to list many of the early productions of mills and engines. Within the last half century, we have confined ourselves to only a few of the more significant types of installations and some special incidents.

# HISTORICAL REPRODUCTIONS

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Pittsburgh in the Year 1826

MANUFACTURES.

## AIR FOUNDERIES.

THERE are few even in our city, who are aware of the immense business that has been done, and is now doing in these establishments. There are no less than eight of them in full operation.

### THE PITTSBURGH FOUNDRY.

Was erected as early as the year 1804, by Mr. Joseph McCurg, and was the first establishment of the kind west of the mountains. The opposition that Mr. M. met with from his friends shows how limited the views of the citizens of that period were, in relation to the important situation of Pittsburgh, and the great sources of wealth that lay around it. Many thought at that time, that Mr. McCurg would certainly be ruined—that a foundry was useless—and that he could not possibly succeed—he persevered however, and subsequent years have shown the fallacy of human prognostications—he realized a fortune—has retired from business, and left the old foundry to fill the pockets of his successors with better stuff than pig metal.

During the last war Mr. McCurg had a very large contract with the national government, for furnishing ordnance and ball. The principal part of which were destined for the fleet on Lake Erie. The Arsenal at Lawrenceville exhibits a long range of field pieces, carromades, &c. of his manufacture, that are as beautiful as they are substantial and true—they having stood all these nice and scrupulous tests of strength and measurement, which the ordnance department are wont to use in their inspections.

The Pittsburgh foundry is at present carried on by Messrs. Alexander McCurg, Cernear and Curney, on an extensive scale. There are two furnaces which are daily in use and the amount of metal that is converted into wheels, shafts, cannon, stores, hollow ware, grates and all manner of castings, is about 600 tons per annum. From 25 to 30 hands are constantly employed and yearly castings in form of 65 to 70 dollars per ton, consequently the manufactures of this foundry amount to 40,800 dollars per annum. Of the castings made during the past year, about 500 tons found a market in Ohio, Kentucky, Indiana, &c. The present proprietors have now a large contract with

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by S. Jones Published 1826

MANUFACTURES.

government for furnishing 30 pieces of ordnance, from 6 to 24 pounders. To gentlemen who are fond of particularities or who are ignorant of the scrupulous exactness with which the business of the ordnance department is conducted at Washington, it would be worth a walk to the foundry, to see the drawing of a 24 pounder. Beside the master hand that is visible in the sketch there is nothing can surpass the correctness with which every part is laid down, and the minuteness with which every 'dot and tittle' is required to be executed.

In order to facilitate the operations of boring these pieces, the contractors intend to put up this summer, a steam boring mill, to which will be attached machinery for turning, grinding, &c. This branch being heretofore done by horse power.

McCurg & Co. have two large ware-houses—one at the foundry, corner of Smithfield and Fifth streets, and the other in Wood, between Front and Water streets, where may be seen some fine specimens and patterns in their line.

### JACKSON FOUNDRY.

Corner of Sixth and Liberty streets—on KNOX'S, LEITCH'S and SORVINS, and At this establishment during the past year made, some of the heaviest castings ever made. About 500 tons of pig metal are converted annually into machinery of all kinds; stove boxes, plough plates, and in short, every thing desired, from the weight of 4 tons down to twenty pounds are generally employed, bushels of coal consumed yearly.

### EAGLE FOUNDRY.

In Kensington. This establishment was BRAZZER, but is now conducted by the same owner the Jackson foundry, and composed of the castings of both foundries. The consumption of metal at the 250 tons yearly. Employs about 12 hands about 7000 bushels of coal. The value of establishments amount annually to about As to the various articles manufactured at it would not be hazardous our veracity were of the first order. The gentlemen v

### APPENDIX.

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from 8 to 10 hundred tons of Blooms, from 25 to 30 tons steel, and 100,000 bushels coal.

KINGS, HIGBY & ANDERSON.

### PENN FOUNDRY & STEAM ENGINE FACTORY.

OF MESSRS. McCURG, WADE & Co.,

is situated at the corner of O'Hara and Water streets, in the Northern Liberties, and is the only Foundry to the West of the Allegheny, at which become steam Engines, heavy cannon, and field artillery, are made. Besides these, however, there are manufactured rail road cars, and rail road machinery of all kinds, engines for steam boats, mills and manufacturing; gun carriages, cannon balls, shells, grape and canister shot, and castings and mill machinery. The establishment has in operation three steam engines, of ten, thirty and thirty-five horse power; gives constant employment to 290 workmen; consumes annually 75,000 bushels of coal, uses 1600 tons of pig metal, 150 tons of Bar Iron, and 20 tons of steel. — *Laford's Western Address Directory.*

Messrs. McCurg, Wade & Co., have a warehouse at No. 88 Front street, at which a large assortment of Castings, manufactured at their Works, are kept for sale. The total annual value of the product of their establishment, is about \$300,000.

# HISTORICAL REPRODUCTIONS

The *Pittsburgh Foundry* was erected as early as the year 1801, by Joseph McClurg, and was the first establishment of the kind west of the mountains. The opposition that Mr. McClurg met with from his friends shows how limited the views of the citizens of that period were in relation to the important situation of Pittsburgh, and the great sources of wealth that lay around it. Many thought at that time that Mr. McClurg would certainly be ruined, that a foundry was useless, and that he could not possibly succeed. He persevered, however, and subsequent years have shown the fallacy of human prognostications. He realized a fortune, has retired from business, and left the old foundry to all the pockets of his successors with better stuff than placent. The foundry is at present carried on by A. McClurg, Guthrie & Co., on an extensive scale. There are two furnaces in daily use, which produce some 600 tons of castings a year. The cannon used by Com. Perry on Lake Erie were cast here, and the United States government still uses it as a source of supply of cannon and balls. The *Season Foundry*, corner of Sixth and Liberty streets, is owned by Messrs. Kingston, Lightner & Bowers. It makes stoves, grates, wagon-boxes, plow-plates, machinery and all kinds of heavy castings. It employs twenty hands and turns out 600 tons of castings annually. The *Engle Foundry*, in Kensington, is operated by the same men, but was erected by A. Beelen. It has a hot-blast & Marmier's furnace, which was situated on Jacob's Creek. Steam rises from its mouth, and went into blast on the first of November, 1790.

In 1803 the first iron foundry was established in Pittsburgh by Mr. Joseph McClurg. The growth of the foundry business in this city from that time was steady, and at periods rapid. It ranks second in the iron business of Pittsburgh in the amount of capital invested, extent of ground and buildings occupied, and number of hands employed. The variety of their staple castings is large; and there is no description of foundry work which the skill facilities and resources of the firms engaged in the business does not justify them in undertaking. Heavy mill gearing, railroad castings, copper mining machinery, rolling mill castings, cotton and sugar mills and presses, cannon, plows, chilled wheels, shafts, machines for punching, drilling and planing iron, &c., &c., hollow ware, stoves, grates, platform and other varieties of scales, steam engine work, a long list of articles known as domestic hardware, and in fact every description of form which necessities and luxuries demand, are daily turned out from foundries located in this community.

In these foundries may be cast articles ranging from the heavy Columbiad (cannon) weighing 100,000 pounds, throwing a ball of 1000 pounds, to the finest Berlin work of articles not larger than a finger.

The casting of cannon is not at present being prosecuted. Although the Fort Pitt cannon foundry is at present not in use, it is an object of pride to Pittsburghers. Established in 1803, it has cast cannon for three wars in which the government of the United States has been involved. A portion of the guns used on the United States ships on Lake Erie, at Perry's victory, were cast at this establishment. Guns and shells were also cast for the use of our armies in the Mexican campaign; and during the rebellion, in addition to a large amount

of guns of the more ordinary calibre, this establishment made the largest guns in the world.

The foundry was originally located on the corner of Fifth avenue and Smith-field street, on the lot where now stands the Custom House, and was established by Joseph McClurg in 1803. In the seventy years of its existence its operations have been conducted by several firms, among which were Wade & Totten, Knapp, Wade & Co., Knapp, Rudd & Co., The Knapp Fort Pitt Foundry Co., Chas. Knapp, Esq., and Chas. Knapp's Nephews.

Since 1849 there have been 2,408 cannon and mortars made in the establishment, of which number 2,038 were cast from 1861 to 1864.

The following table shows the number and size of the guns cast, together with their weight and the weight of the ball or shell carried by them.

The army guns of 8, 10, 12, 20 lbs., are technically known as Columbiads.

| No. of Guns. | Size of bore. | Service designed for. | Weight each lbs. | Shot or Shell. | Weight each lb. |
|--------------|---------------|-----------------------|------------------|----------------|-----------------|
| 600          | 9 inch.       | Navy.                 | 9,100            | Ball.          | 70              |
| 10           | 10 "          | "                     | 16,800           | "              | 70 "            |
| 50           | 11 "          | "                     | 16,800           | Shell.         | 130 "           |
| 58           | 15 "          | "                     | 43,900           | Ball.          | 450 "           |
| 1            | 20 "          | "                     | 100,000          | "              | 1,000 "         |
| 200          | 8 "           | Army.                 | 8,400            | "              | 64 "            |
| 100          | 10 "          | "                     | 15,900           | "              | 128 "           |
| 50           | 15 "          | "                     | 50,000           | "              | 450 "           |
| 1            | 20 "          | "                     | 116,497          | "              | 1,000 "         |
| 200          | 8 & 10 "      | Howitzer.             | "                | Shell.         | 50 "            |
| 150          | 18 "          | Mortars.              | "                | "              | 50 & 84 "       |
| 150          | 4 1/2 "       | Rifle Guns.           | "                | Ball.          | 200 "           |
| 150          | 4 1/2 "       | "                     | "                | "              | 38 "            |

The balance 6 and 12 pounders.

The 15-inch army guns enumerated in the above table, are 17 feet 9 inches long; the navy guns 17 feet 5 inches long; and both descriptions 4 feet in diameter at the trunnions.

During the continuation of the civil war, these works were continuously running, with the exception of Sundays, and in addition to the great number of guns turned out, 10,000,000 pounds of shot and shell. Many of the other foundries were also engaged in furnishing shot and shell.

A circumstantial history of each of the foundries, with however so brief mention of interesting matters connected with them, would occupy more space than it is convenient to devote to the whole iron business of Pittsburgh, and we content ourselves with simply exhibiting in tabular form the progress of the foundry business, from 1804 to 1861, showing the number of foundries, hands and tons of metal consumed.

"In the Centennial Year," by Geo. H. Thurston, in 1876.

(Inset) — "History of Allegheny County," by Warner, 1888.

\*This description was written by Mrs. Ann Rexall in the notes of her visit to Pittsburgh in 1828

# HISTORICAL REPRODUCTIONS

116

PITTSBURGH AS IT IS.

Foundries consume

Value.

## CANNON FOUNDRY.

Established by Joseph M'Clurg, in 1814—now carried on by Knap, Wade & Co.

The first cannon made were cast in the old Pittsburgh Foundry, at the corner of Fifth and Smithfield streets, on the ground now occupied by the Custom House and Post Office. They were bored and finished in works erected for the purpose, at the corner of O'Hara and Etna streets, which made the beginning of the present Fort Pitt Iron Works, where the manufacture of cannon has been continued ever since. At the commencement of the works, and for some years afterwards, the boring machinery was driven by horse-power; for at that period there were only three or four steam engines in operation in the city or neighborhood.

The first contracts for casting cannon at this foundry, were made for supplying the fleet on Lake Erie, and for the defence of New Orleans, during the war of 1812. A large number of cannon

IRON.

117

have since been made at the works, of all sizes, weighing from 800 to 15,300 pounds each; about 1,500 in all up to this time.

There is consumed by the foundry,

|                                                                                          | Value.   |
|------------------------------------------------------------------------------------------|----------|
| 800 tons of Pig Iron,.....                                                               | \$18,000 |
| 15,000 bushels of Coal,.....                                                             | 600      |
| 4,000 Fire Brick,.....                                                                   | 80       |
| 200 gallons of Oil,.....                                                                 | 250      |
| 20,000 feet of Lumber,.....                                                              | 300      |
| 3,000 bushels of Sand and Loam,.....                                                     | 180      |
| 100 " " Fire Clay,.....                                                                  | 16       |
| Hardware and Files to amount of,.....                                                    | 100      |
|                                                                                          | <hr/>    |
|                                                                                          | \$19,526 |
| There are employed in this Foundry, twenty-eight hands, whose wages will amount to,..... | 12,040   |
| The value of the work, is,.....                                                          | 40,000   |
| The capital in land, buildings and machinery, used in the business, is,.....             | 41,000   |

## Sixty Years Ago.

MONDAY, FEBRUARY 22, 1864.

The greatest gun of the age is cast at the Fort Pitt foundry, Pittsburgh. The gun is 20 inches in diameter with a bore of 210 inches.

"The weather has moderated and the indications are favorable for a general thaw, a consummation devoutly to be wished."

"Pittsburgh As It Is," by Geo. H. Thurston—1857.

(Inset) — Clipping from Pittsburgh Post.

rank next in the iron industries of the city. In this is necessarily embraced the engine and machine works of Pittsburgh, as many of them have extensive facilities as component parts of their establishments.

Some part of the early history of the establishment of the foundry, industry of Pittsburgh is mentioned in the opening statements of this chapter on the first of the four divisions of the city. It is a sufficient indication of this that the first firm foundry established in Pittsburgh was in 1803 by Joseph McCreight, of which its general business the firm of A. Garrison & Co. is the direct successor. The famous Fint Cannon Foundry was also a contributive success, as in the casting of cannon. Joseph McCreight made the guns for Perry's victory in 1813, and Cannon & Company, in 1810 obtained the monopoly as the "leading" foundry, and even then cannon balls for the United States. Also the Fint Cannon Foundry, in the important year 1861, cast the casting of their first and last cannon during the Civil War, as in that first contribution to exonerate that nation.

The fundus was originally located on the corner of Fifth, a street and English field street, in its old name near what the Queen Home, and was established by Joseph Metching in 1810. In the twenty years of his residence in operations was conducted by several firms, among which was Kemp & Co., Chas. Kemp & Co., Kemp, Field & Co., The Kemp Port, Kemp & Co., Chas. Kemp & Co., and Chas. Kemp's Regulator. This business, however, is now discontinued, and the buildings and ground occupied by Mackintosh, Humphall & Co. It spent his government, however, and require similar service to active. Philadelphia Standard to day are as well, and more so, than twenty years ago.

The family business ranks second in the two business categories of Pittsburgh in the amount of capital invested. The variety of their capital earnings is large, and there is no description of founding work which the skill, facilitated and resources of the firms engaged in the business does not justify them in undertaking.

With the increase and growth of Pittsburgh in the past few decades the four-family business, as a class, had gradually subdivided until it was variously branched, possibly may be classified as general contractors, some manufacturing, heavy machine foundries, light machine foundries, steam engines, machine shops with foundries, engineering construction without foundries, engineers, conductors, machinists, foundries, electrical engineering, etc., etc.

the numerous iron industries. In the gradual progress of the foundry business in Allegheny county the making of steam engines and other machinery became an adjunct to the operations of many foundries, and in like manner capacities of greater or less capacity were added to the machine shops, which, therefore, rendered it difficult to separate them in their individualities in any branch tracking of the successive establishments. In many cases the engine building part of the plants were eliminated from the foundry, and others the foundry divisions of the business were disposed of to new firms, secondly as either division of the iron industry increased in volume.

The first foundry established in the western counties of Pennsylvania was at

*Miner*—Not a year renounces but brings with it sufficient matter, relative to the improvement of this place, to fill a pamphlet even larger than our *Miner*. But from the small space left us, after admitting other matter equally important to the purchaser, we must content ourselves with hastily sketching the most prominent and important that a lively view of the town affords.

In addition to the steam boat mentioned in the last year's Almanack, there has been built by the "Ohio Steam Boat Company," one of 110 feet keel, called the *Buffalo*, intended to run between the Falls and this place, but if found too large for the Ohio, she will be stationed on the Mississippi. There is another boat on the stocks, building by the "Albion and Croom Steam Company," length of keel 115 feet, and about 400 tons burthen, intended for the Mississippi. Besides the four air foundries already established and in successful operation, Mr. Joseph McCleary is building another on the bank of the Allegheny, immediately above the gorge. At Mr. Anthony Berien's foundry, about 400 tons of castings are made annually. At the same establishment he has erected a mill for boring cylinders, air-pumps and pipes for steam engines, for turning

While in command of Fort Pitt, ordered four hundred round shot,

The first foundry at Pittsburgh, as before said, was at the corner of Fifth ave. and Smithfield street, where the Post Office now stands, and called the "Pittsburgh Foundry," by Joseph McClurg, Joseph Smith, and John Gornaley, in 1803.

Shortly after his reelection McGuffey bought out his partners, Smith and Seymour, and with his son, Alexander McGuffey, conducted the business successfully until 1841. From 1841 to 1822, the family was enriched and aggrandized by the profits of the business. In 1822, the McGuffey family sold the business to H. F. Bellows & McGuffey, and then by Alexander McGuffey & Co. till 1850, when the establishment was purchased by Kingsland & Lightner, who were proprietors of the Boston and Exeter companies, the partners of which was merged into that of the Kingsland family. From 1851 to 1859 the firm was known as Kingsland, Lightner & Co. In 1859, American Garrison obtained an interest in the business, and in 1860 Mr. Garrison, who was a nephew of Kingsland, and H. F. Bellows, a nephew of Lightner, succeeded their uncles, and associating with them H. F. Garrison, carried on the business under the name of Bellows & Garrison till 1859, then H. F. Bellows withdrew. From 1861 to 1863, the firm was Bellows & Garrison, and from 1863 to 1867, Bellows, Garrison & Co. In 1864, Mr. Garrison & Co. bought Mr. Garrison's interest, and the present partnership of A. Garrison & Co. formed January 1st, 1868. In 1830 the first contract of waterpipe for the

From Geo. H. Thurston's "Allegheny County of 1888."

(Inset)—Extract from *Cramer's Pittsburgh Magazine Almanack*, published 1810, by Zudok Cramer.

## HISTORICAL REPRODUCTIONS

*Pittsburgh, March 2d, 1876.*

To the WATER COMMITTEE OF COUNCILS  
OF THE CITY OF PITTSBURGH.

*Gentlemen:*

*We have carefully read and considered the proposal of Messrs. MACKINTOSH, HEMPHILL & CO. to your committee, and from our knowledge of that firm are certain that they have not made this proposal without thoroughly investigating the whole subject and satisfying themselves that they can do what they propose. We therefore respectfully request your serious consideration of their proposal.*

HUSSEY, WELLS & CO.

JOS WOODWELL & CO.

REESE, GRAFF & WOODS.

MILLER, METCALF & PARKIN.

BAILEY, FARRELL & CO.

A. GARRISON & CO.

SINGER, NIMICK & CO.

WM. CLARK & CO.

ROBINSON, REA & CO.

PARK, BRO. & CO.

SHOENBERGER & CO.

CARNEGIE, BROS. & CO.

LUCY FURNACE CO.

BROWN & CO.

RITER & CONLEY.

A tribute paid by fifteen representative Pittsburgh firms endorsing our capacity to undertake reconstruction of Pittsburgh Water System, as per our proposal of February 29, 1876.

# A WORLD'S RECORD

1866-1924

THE LAST HALF CENTURY'S

## TEACHINGS FROM EXPERIENCE

IN DESIGNING AND BUILDING FOR THE IRON AND STEEL AND NON-FERROUS INDUSTRIES

### 294 ENGINES

|                                                                                                 |    |
|-------------------------------------------------------------------------------------------------|----|
| Simple and Miscellaneous Engines . . . . .                                                      | 69 |
| Horizontal and Vertical, Simple and Compound Automatic<br>Engines . . . . .                     | 86 |
| Blowing Engines . . . . .                                                                       | 50 |
| Simple, Twin and Tandem, Compound, Geared and Direct-Con-<br>nected Reversing Engines . . . . . | 89 |

294

*An Average of One Engine Every Two Months for Fifty Years*

### 666 ROLLING MILLS

|                                                       |    |
|-------------------------------------------------------|----|
| Blooming Mills . . . . .                              | 64 |
| Universal Mills . . . . .                             | 41 |
| Billet and Lamberton Mills . . . . .                  | 10 |
| Plate Mills . . . . .                                 | 64 |
| Rail and Structural Mills . . . . .                   | 21 |
| Sheet and Tin Mills . . . . .                         | 73 |
| Merchant and Bar Mills . . . . .                      | 96 |
| Continuous and Rod Mills . . . . .                    | 46 |
| Sheet Bar and Skelp Mills . . . . .                   | 32 |
| Strip and Hoop Mills . . . . .                        | 32 |
| Double-duo, Miscellaneous and Special Mills . . . . . | 18 |
| Tube, Pipe Mills and Seamless Tube Mills . . . . .    | 13 |
| Non-ferrous Mills:                                    |    |
| Brass and Copper, Sheet and Rod Mills . . . . .       | 95 |
| Aluminum Mills . . . . .                              | 31 |
| Zinc and Lead Mills . . . . .                         | 19 |
| Tin Foil and Platinum Mills . . . . .                 | 8  |
| Precious Metal Mills . . . . .                        | 3  |

510

156

666

*An Average of Over One Mill per Month for Fifty Years*

AN AVERAGE OF ONE ENGINE OR MILL EVERY THREE WEEKS  
IN ABOVE PERIOD

*A World's Record*

# 1871-1924

## A CONTINUOUS PERFORMANCE—OUR 53-YEAR RECORD

*Building and Designing*

### 64 BLOOMING MILLS



| Year | Company                            | Size, Inch | Year | Company                                   | Size, Inch |
|------|------------------------------------|------------|------|-------------------------------------------|------------|
| 1877 | Shoenberger & Co.                  | 30         | 1899 | Dominion Iron and Steel Corporation       | 35         |
| 1878 | Roane Iron Co.                     | 25         | 1900 | Cambria Steel Co.                         | 40         |
| 1879 | Springfield Iron Co.               | 30         | 1900 | Carnegie Steel Co. (Duquesne)             | 40         |
| 1879 | Naylor & Co.                       | 30         | 1901 | St. Clair Steel Co.                       | 40         |
| 1880 | Pittsburgh Bessemer Steel Co. Ltd. | 30         | 1901 | Inland Steel Co.                          | 24         |
| 1883 | Riverside Iron Co.                 | 32         | 1901 | Colorado Fuel and Iron Co.                | 40         |
| 1885 | Joliet Steel Co.                   | 36         | 1902 | Union Steel Co.                           | 40         |
| 1885 | Laughlin & Junction Steel Co.      | 32         | 1902 | Deering Harvester Co.                     | 35         |
| 1885 | Wheeling Steel Works               | 36         | 1903 | Lackawanna Steel Co.                      | 40         |
| 1886 | Jefferson Iron Works               | 24         | 1904 | Eastern Steel Co.                         | 32         |
| 1886 | Pottstown Iron Co.                 | 36         | 1906 | Milliken Bros. Co.                        | 40         |
| 1887 | Phoenix Iron Co.                   | 36         | 1906 | Milliken Bros. Co.                        | 32         |
| 1889 | Pennsylvania Steel Co.             | 36         | 1906 | Eastern Steel Co.                         | 44         |
| 1889 | Penn Steel Co.                     | 34         | 1907 | Jones & Laughlin Steel Co.                | 40         |
| 1889 | Passaic Rolling Mill Co.           | 32         | 1907 | Pittsburgh Steel Co.                      | 46         |
| 1889 | King, Gilbert & Warner             | 32         | 1907 | Carnegie Steel Co. (Edgar Thomson Works)  | 40         |
| 1889 | Allegheny Bessemer Steel Co.       | 32         | 1908 | National Tube Co.                         | 40         |
| 1890 | Hainsworth Steel Co.               | 32         | 1909 | Portsmouth Steel Co.                      | 35         |
| 1890 | Jones & Laughlin Steel Co.         | 32         | 1910 | Algoma Steel Co.                          | 35         |
| 1890 | Ashland Steel Co.                  | 32         | 1913 | Broken Hill Proprietary Co. (Australia)   | 35         |
| 1890 | Jefferson Iron Works               | 24         | 1913 | Bethlehem Steel Co.                       | 35         |
| 1891 | Shenango Valley Steel Co.          | 35         | 1915 | United Alloy Steel Corporation            | 35         |
| 1891 | Carnegie, Phipps Co.               | 35         | 1915 | Inland Steel Co.                          | 40         |
| 1892 | National Tube Co.                  | 35         | 1916 | Mark Manufacturing Co.                    | 35         |
| 1893 | Bellaire Nail Works                | 32         | 1918 | Sharon Steel Hoop Co.                     | 34         |
| 1894 | Carnegie Steel Co. (Homestead)     | 28         | 1919 | Tata Iron and Steel Co. (India)           | 40         |
| 1894 | Carnegie Steel Co. (Duquesne)      | 38         | 1920 | Societe Anonyme John Cockerill, (Belgium) | 36         |
| 1895 | Benwood Iron and Steel Co.         | 36         | 1922 | LaBelle Iron Works                        | 35         |
| 1895 | Troy Iron and Steel Co.            | 35         | 1923 | *Otis Steel Co. (Illustrated above)       | 40         |
| 1896 | Buhl Steel Corporation             | 35         | 1924 | Timken Roller Bearing Co.                 | 35         |
| 1896 | Park Bros. Co.                     | 32         |      |                                           |            |
| 1897 | Oliver-Snyder Co.                  | 32         |      |                                           |            |
| 1898 | Aetna-Standard Iron Co.            | 36         |      |                                           |            |
| 1899 | W. D. Wood & Sons Co.              | 35         |      |                                           |            |

#### **11 Blooming Mills in the last 11 years—A record for this type of construction**

It is a very simple matter to figure that with the length of life of many of these mills and a conservative average yearly production from them, the cost of these mills would be only a small fraction of a cent per ton of products they have produced for the organizations that acquired and operated them.

# 1878-1913

## 84 REVERSING MILL ENGINES IN 35 YEARS

*In less than every 155 days, for 35 years, we  
furnished a Reversing Engine to the industry*

| Year | Company                          | Year | Company                                   |
|------|----------------------------------|------|-------------------------------------------|
| 1878 | Roane Iron Co.                   | 1897 | King, Gilbert & Warner                    |
| 1878 | Roane Iron Co.                   | 1898 | Carnegie Steel Co.                        |
| 1880 | Spang Iron and Steel Co.         | 1898 | Lorain Steel Co.                          |
| 1881 | Union Iron Mills                 | 1899 | International Bank of Commerce,<br>Russia |
| 1884 | Pennsylvania Steel Co.           | 1899 | Dominion Iron and Steel Co.               |
| 1884 | Pittsburgh Bessemer Steel Co.    | 1899 | W. D. Wood & Sons Co.                     |
| 1887 | Eastern Steel Co.                | 1899 | International Bank of Commerce,<br>Russia |
| 1887 | Phoenix Iron Co.                 | 1899 | Carnegie Steel Co. (Homestead)            |
| 1887 | Passaic Rolling Mills Co.        | 1899 | Carnegie Steel Co. (Duquesne)             |
| 1889 | Moorhead, McCleane Co.           | 1899 | International Bank of Commerce,<br>Russia |
| 1889 | Pennsylvania Steel Co.           | 1900 | Cambria Steel Co.                         |
| 1889 | Carnegie Bros. & Co.             | 1901 | St. Clair Steel Co.                       |
| 1889 | Laughlin Junction Steel Co.      | 1901 | Colorado Fuel and Iron Co.                |
| 1889 | Cartwright, McCurdy & Co.        | 1901 | Sharon Steel Co.                          |
| 1889 | Passaic Rolling Mills Co.        | 1901 | Carnegie Steel Co. (Homestead)            |
| 1889 | Pottsville Iron and Steel Co.    | 1902 | Union Steel Co.                           |
| 1889 | King, Gilbert & Warner           | 1902 | Crucible Steel Co.                        |
| 1889 | Passaic Rolling Mills Co.        | 1902 | Deering Harvester Co.                     |
| 1889 | Lackawanna Steel Co.             | 1903 | Lackawanna Steel Co.                      |
| 1890 | Jones & Laughlin Steel Co.       | 1903 | Lorain Steel Co.                          |
| 1890 | Shoenberger & Co.                | 1903 | Lorain Steel Co.                          |
| 1890 | Hainsworth Steel Co.             | 1903 | Lackawanna Steel Co.                      |
| 1890 | Jones & Laughlin Steel Co.       | 1903 | Lackawanna Steel Co.                      |
| 1890 | Allegheny Bessemer Co.           | 1903 | Lorain Steel Co.                          |
| 1890 | Ashland Steel Co.                | 1904 | Eastern Steel Co.                         |
| 1890 | Jones & Laughlin Steel Co.       | 1905 | New York State Steel Co.                  |
| 1890 | M. H. & Co.                      | 1906 | Eastern Steel Co.                         |
| 1891 | Shenango Valley Steel Co.        | 1906 | Carnegie Steel Co.                        |
| 1891 | West Superior Iron and Steel Co. | 1907 | Carnegie Steel Co. (Duquesne)             |
| 1891 | Carbon Iron Co.                  | 1907 | Jones & Laughlin Steel Co.                |
| 1892 | Wm. Clark & Co.                  | 1908 | Maryland Steel Co.                        |
| 1892 | National Tube Works              | 1909 | Forged Steel Wheel Co.                    |
| 1894 | Carnegie Steel Co.               | 1909 | Portsmouth Steel Co.                      |
| 1894 | Carnegie Steel Co.               | 1911 | Algoma Steel Co.                          |
| 1895 | Jones & Laughlin Steel Co.       | 1911 | Algoma Steel Co.                          |
| 1895 | Bethlehem Iron Co.               | 1911 | Pittsburgh Crucible Steel Co.             |
| 1895 | Bethlehem Iron Co.               | 1912 | United Steel Co.                          |
| 1895 | Bethlehem Iron Co.               | 1913 | Broken Hill Proprietary Co.               |
| 1895 | Carnegie Steel Co. (Homestead)   | 1913 | Broken Hill Proprietary Co.               |
| 1895 | Troy Steel and Iron Co.          |      |                                           |
| 1896 | Oliver-Snyder Steel Co.          |      |                                           |
| 1896 | Oliver Iron and Steel Co.        |      |                                           |
| 1897 | Carnegie Steel Co.               |      |                                           |

### *This is a Record of Masterly Performance*

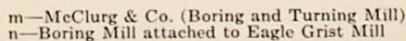
We fully realize today that the electric motor is superseding the steam engine as the power unit for many mills; nevertheless, this does not alter the fact that our Reversing Mill Engines have done, and are doing, their full share to insure our reputation as "MASTER BUILDERS."



a—McClurg & Co. (Pittsburgh Foundry)  
b—McClurg & Co. (Bayard Foundry)

c—Kingsland Light  
d—Kingsland Light

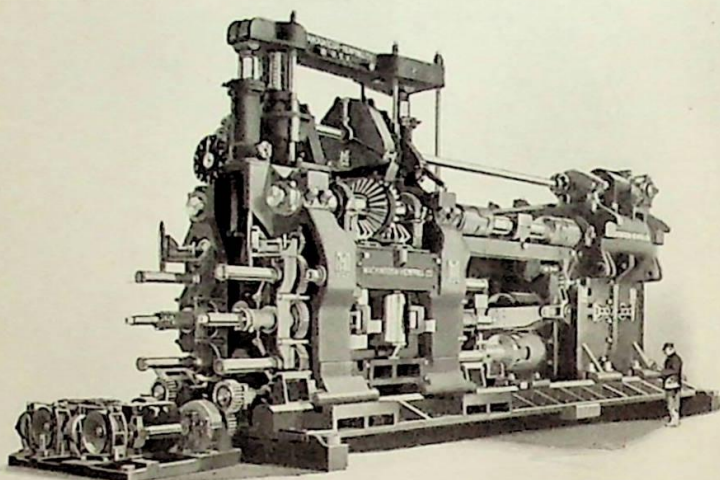
& Co. (Eagle)  
& Co. (Jackson)



# 1871-1924

## EACH MILL A BETTER MILL

*With 53 years of continuous engineering and building experience of*  
**41 UNIVERSAL MILLS**



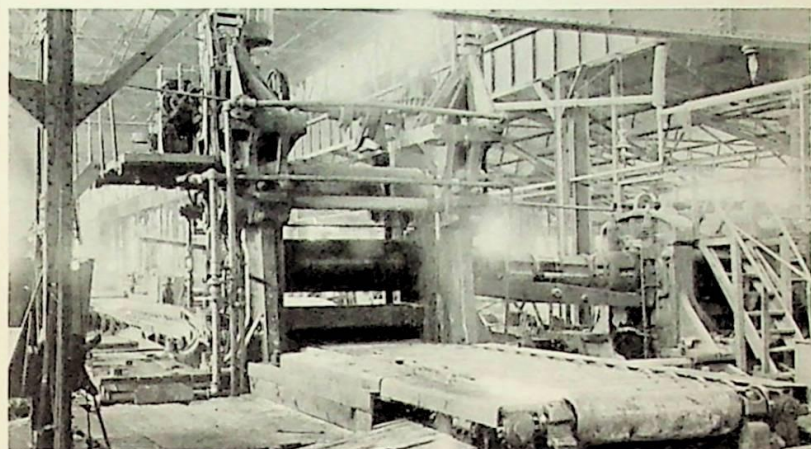
| Year | Company                         | Size<br>Inch | Year | Company                               | Size<br>Inch |
|------|---------------------------------|--------------|------|---------------------------------------|--------------|
| 1871 | American Sheet and Boiler Plate | 22           | 1899 | U. S. Aluminum Co.                    | 15           |
| 1871 | Graff, Bennett & Co.            | 22           | 1901 | Sharon Steel Co.                      | 30           |
| 1875 | Elmira Iron and Steel Co.       | 18           | 1903 | Illinois Steel Co.                    | 30           |
| 1878 | A. Kroman & Co.                 | 18           | 1903 | Lackawanna Steel Co.                  | 30           |
| 1879 | Bennett & Co.                   | 18           | 1903 | National Tube Co.                     | 30           |
| 1879 | National Tube Works             | 24           | 1903 | Lackawanna Steel Co.                  | 32           |
| 1880 | Zug & Co.                       | 16           | 1905 | Youngstown Sheet and Tube Co.         | 27           |
| 1880 | Standard Iron Co.               | 22           | 1905 | National Tube Co.                     | 25           |
| 1882 | Pittsburgh Steel Casting Co.    | 24           | 1906 | Cambria Steel Co.                     | 24           |
| 1883 | Pottstown Iron Co.              | 24           | 1908 | Inland Steel Co.                      | 24           |
| 1885 | National Rolling Mills Co.      | 22           | 1908 | Michigan Copper and Brass Co.         | 24           |
| 1887 | Carnegie, Phipps & Co.          | 32           | 1908 | C. G. Hussey Co.                      | 24           |
| 1888 | Carbon Iron Co.                 | 22           | 1911 | Forged Steel Wheel Co.                | 34           |
| 1890 | Carnegie, Phipps & Co.          | 30           | 1914 | United Alloy Steel Corporation        | 34           |
| 1891 | Central Iron and Steel Co.      | 25           | 1916 | Steel and Tube Co. of America         | 30           |
| 1895 | Bethlehem Iron Co.              | 26           | 1918 | Societe Anonyme Acc. Ferriere (Italy) | 25           |
| 1895 | Bethlehem Iron Co.              | 32           | 1919 | Dominion Foundries and Steel Ltd.     | 27           |
| 1896 | Illinois Steel Co.              | 30           | 1921 | Jones & Laughlin Steel Co.            | 32           |
| 1898 | Carnegie Steel Co.              | 30           | 1923 | *Youngstown Sheet and Tube Co.        |              |
| 1898 | Illinois Steel Co.              | 40           |      | (Illustrated above)                   | 30           |
| 1899 | Lukens Iron and Steel Co.       | 28           | 1923 | Stewarts & Lloyds (England)           | 34           |

***It is safe to say that 90% of all of the Universal Mills built in the United States have been of our design and workmanship***

A most significant fact in connection with the design and construction of many of our early mills, is that whereas the possibility of daily maximum production, was figured for at the time they were installed, few then realized, due to the state of the industry, how substantially Mr. Hemphill and his associates were building for enormous increases in future tonnages; today the vision for these future possibilities is an outstanding verity. Thanks to such vision many a one of our mills,—which really belongs to another generation, is rendering splendid service today—and like the proverbial “span of man” is serving its allotted “three score years and ten.”

# 1868-1916

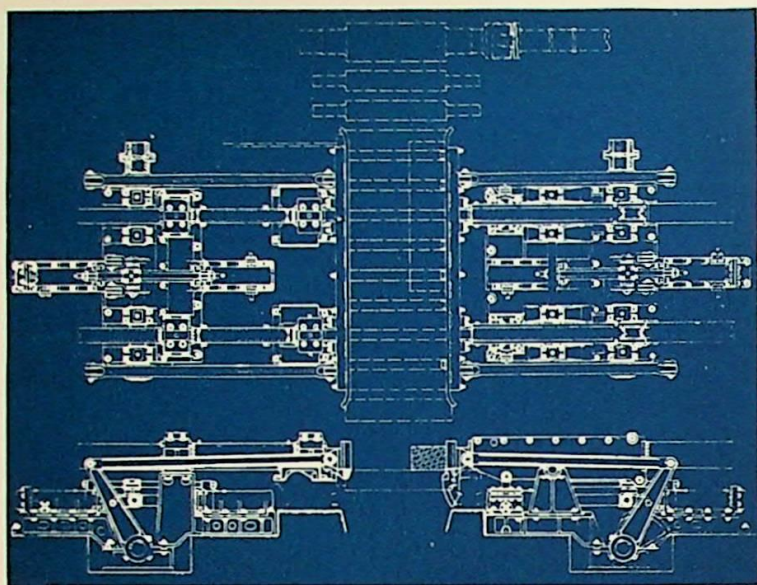
## 64 PLATE MILLS IN 48 YEARS—ONE EVERY NINE MONTHS



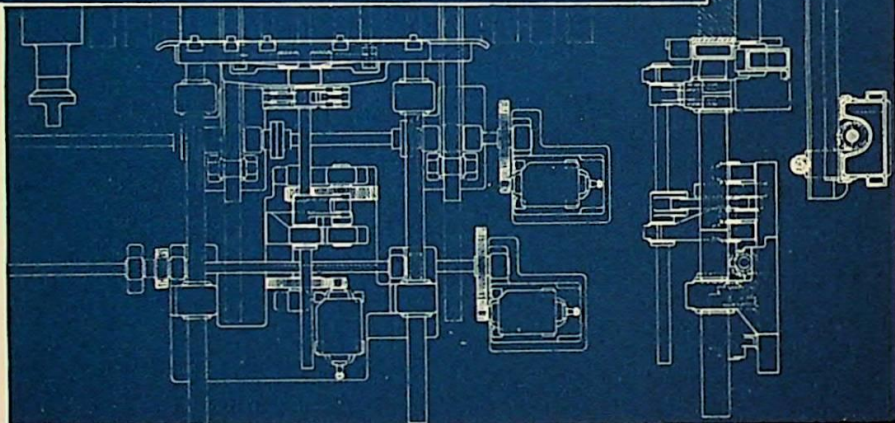
| Year | Company                     | Year | Company                              |
|------|-----------------------------|------|--------------------------------------|
| 1868 | Singer-Nimick & Co.         | 1887 | Bessemer Rolling Mill Co.            |
| 1871 | Wyandotte Rolling Mill Co.  | 1888 | National Rolling Mills Co.           |
| 1872 | Graff Bennett & Co.         | 1889 | Birmingham Rolling Mill Co.—Republic |
| 1872 | Graff Bennett & Co.         |      | Iron and Steel Co.                   |
| 1873 | Bay State Iron Co.          | 1889 | Chas. Huston & Sons                  |
| 1873 | Graff Bennett & Co.         | 1889 | Carbon Steel Co.                     |
| 1874 | Union Iron Co.              | 1889 | Paxton (Central Iron and Steel Co.)  |
| 1874 | Bay State Iron Co.          | 1889 | Moorhead, McClean Co.                |
| 1875 | Lewis Bailey, Dalzel & Co.  | 1890 | Illinois Steel Co.                   |
| 1876 | Pembroke Iron Co.           | 1890 | Chester Rolling Mills                |
| 1877 | Central Iron Works          | 1890 | Wellman Iron and Steel Co.           |
| 1877 | Pottstown Iron Co.          | 1890 | West Superior Iron and Steel Co.     |
| 1879 | Chonteau, Harrison & Valle  | 1891 | McCormick & Co.                      |
| 1879 | Chonteau, Harrison & Valle  | 1892 | Carnegie Steel Co.                   |
| 1879 | Naylor & Co.                | 1893 | Nova Scotia Steel and Forge Co.      |
| 1880 | Oliver Brothers & Phillips  | 1894 | Birmingham Rolling Mill Co.—Republic |
| 1880 | Singer-Nimick & Co.         |      | Iron and Steel Co.                   |
| 1880 | Cincinnati Rolling Mill Co. | 1894 | Shoenberger & Co.                    |
| 1881 | Shoenberger & Co.           | 1895 | Worth Brothers Co.                   |
| 1881 | Hussey, Howe & Co.          | 1895 | Bethlehem Steel Co.                  |
| 1881 | Moorhead & Co.              | 1899 | Lukens Iron and Steel Co.            |
| 1881 | Central Iron Works          | 1900 | Spang, Chalfant & Co.                |
| 1881 | Huston & Penrose Co.        | 1901 | Lukens Iron and Steel Co.            |
| 1882 | Spang Steel and Iron Co.    | 1902 | Chrome Steel Works                   |
| 1882 | Patterson Iron Co.          | 1902 | Moorehead Brothers & Co.             |
| 1882 | Springfield Iron Co.        | 1903 | Lorain Steel Co.                     |
| 1882 | Republic Iron Works         | 1903 | National Tube Co.                    |
| 1883 | Maunee Rolling Mill Co.     | 1903 | Carnegie Steel Co.                   |
| 1883 | Pottstown Iron Co.          | 1905 | Colonial Steel Co.                   |
| 1883 | Republic Iron Works         | 1905 | Portsmouth Steel Co.                 |
| 1883 | Park Brothers & Co.         | 1910 | A. M. Byers Co.                      |
| 1884 | Linden Steel Co.            | 1916 | Societe Anonyme Accearie Ferriere,   |
| 1885 | Singer-Nimick & Co.         |      | Lombarde of Milan                    |
| 1886 | Chester Rolling Mills       |      |                                      |

Just think for a moment of the tremendous tonnage of products these Mills have rolled, and will roll, for ships, cars, tanks, stacks, boilers, bridges, buildings, automobiles, etc., etc.

*These Mills have done their share of the World's Work*



HYDRAULIC  
TYPE

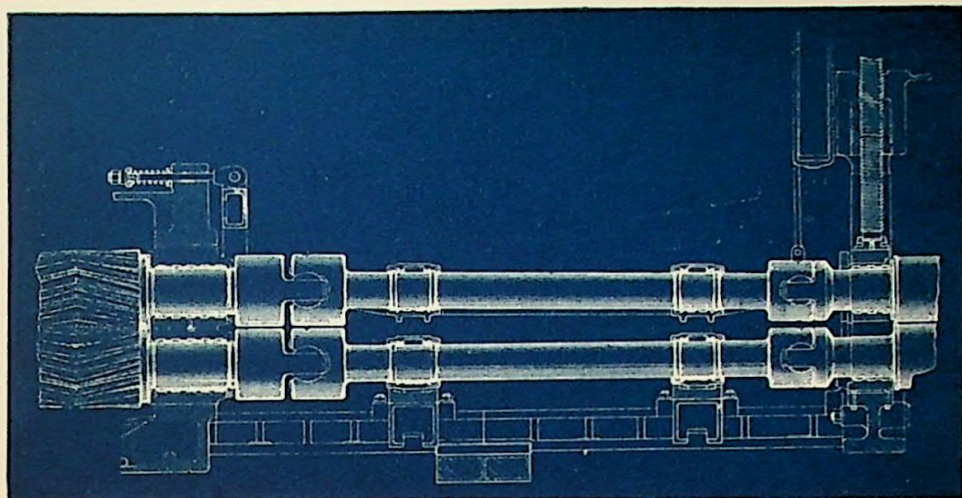


ELECTRIC TYPE

### LIST OF MACKINTOSH-HEMPHILL CO. (PATENTED) MANIPULATORS INSTALLED

|                                                                     |                                     |
|---------------------------------------------------------------------|-------------------------------------|
| Wheeling Steel Corporation, Portsmouth, O. . . . .                  | 35-inch—2 High Blooming Mill        |
| Sharon Steel Hoop Co., Lowellville, O. . . . .                      | 34-inch—2 High Blooming Mill        |
| Tata Iron and Steel Co., Jamshedpur, India. . . . .                 | 40-inch—2 High Blooming Mill        |
| Wheeling Steel Corporation, LaBelle Works, Steubenville, O. . . . . | 35-inch—2 High Blooming Mill        |
| United Alloy Steel Corporation, Canton, O. . . . .                  | 34-inch—Blooming and Universal Mill |
| Otis Steel Co., Cleveland, O. . . . .                               | 40-inch—2 High Blooming Mill        |
| Societe Anonyme John Cockerill, Seraing, Belgium . . . . .          | 35-inch—2 High Blooming Mill        |
| Carnegie Steel Co., Duquesne, Pa. . . . .                           | 40-inch—2 High Blooming Mill        |
| American Sheet and Tin Plate Co., Vandergrift, Pa. . . . .          | 36-inch—2 High Blooming Mill        |

These Manipulators make a Modern Mill responsive to the intelligent control of the operator. They make an Old Mill Modern, and make the operator more capable of using his intelligence. They respond to the call for "MORE TONS."



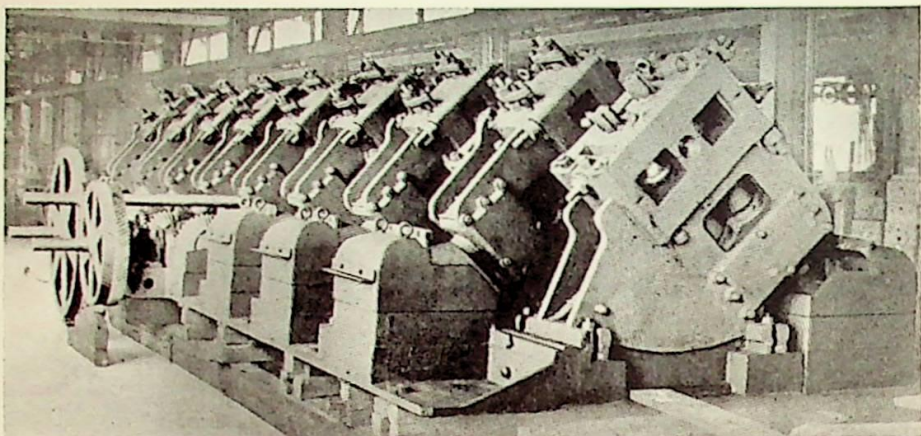
Fifty-Six (56) Installations of our Patented Universal Couplings testify to the  
*Savings in Noiseless Economy*

### LIST OF MACKINTOSH-HEMPHILL CO. (PATENTED) UNIVERSAL COUPLINGS FURNISHED

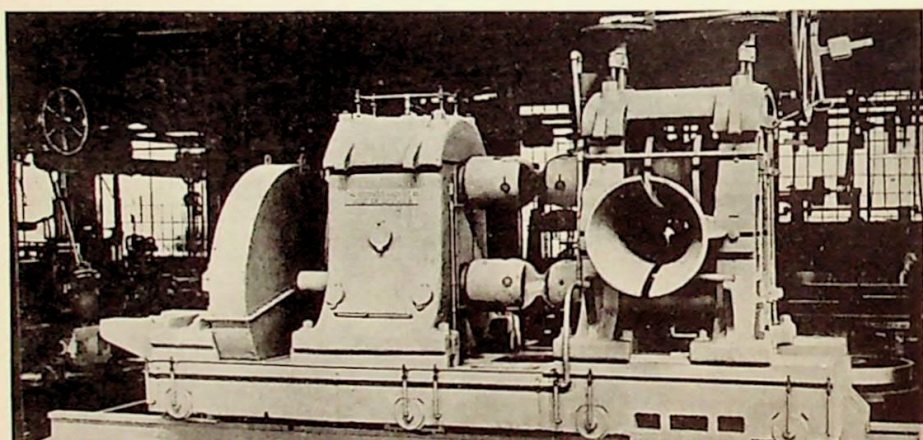
| Size<br>Inch | Customer                                  | Where Used              | Service                      |
|--------------|-------------------------------------------|-------------------------|------------------------------|
| 48           | Otis Steel Co.                            | 40-inch Blooming Mill   | Leading Spindle              |
| 32           | Otis Steel Co.                            | 40-inch Blooming Mill   | Inter. Spindle, Roll End     |
| 38           | Otis Steel Co.                            | 40-inch Blooming Mill   | Inter. Spindle, Pinion End   |
| 20           | Otis Steel Co.                            | 24-inch Sheet Bar Mill  | Drive                        |
| 13 1/2       | Otis Steel Co.                            | 34-inch Universal Mill  | Tilting Tables, Side Shaft   |
| 45           | Stewarts & Lloyds                         | 34-inch Universal Mill  | Leading Spindle              |
| 32           | Stewarts & Lloyds                         | 34-inch Universal Mill  | Inter. Spindle, Roll End     |
| 33 1/2       | Stewarts & Lloyds                         | 34-inch Universal Mill  | Inter. Spindle, Pinion End   |
| 27           | Stewarts & Lloyds                         | 34-inch Universal Mill  | Vertical Roll Spindle        |
| 12           | Stewarts & Lloyds                         | 34-inch Universal Mill  | Screw-down Spindle           |
| 48           | LaBelle Iron Works                        | 35-inch Blooming Mill   | Leading Spindle              |
| 28           | LaBelle Iron Works                        | 35-inch Blooming Mill   | Inter. Spindle, Roll End     |
| 33 1/2       | LaBelle Iron Works                        | 35-inch Blooming Mill   | Inter. Spindle, Pinion End   |
| 38           | Youngstown Sheet and Tube Co.             | 30-inch Universal Mill  | Leading Spindle              |
| 27           | Youngstown Sheet and Tube Co.             | 30-inch Universal Mill  | Inter. Spindle, Roll End     |
| 30           | Youngstown Sheet and Tube Co.             | 30-inch Universal Mill  | Inter. Spindle, Pinion End   |
| 24           | Youngstown Sheet and Tube Co.             | 30-inch Universal Mill  | Vertical Roll Spindle        |
| 39           | Jones & Laughlin Steel Co., Soho          | 32-inch Universal Mill  | Leading Spindle              |
| 30           | Jones & Laughlin Steel Co., Soho          | 32-inch Universal Mill  | Inter. Spindle, Roll End     |
| 30           | Jones & Laughlin Steel Co., Soho          | 32-inch Universal Mill  | Inter. Spindle, Pinion End   |
| 45           | Carnegie Steel Co., Homestead             | 110-inch Plate Mill     | Leading Spindle              |
| 38           | Mark Manufacturing Co.                    | 30-inch Universal Mill  | Leading Spindle              |
| 27           | Mark Manufacturing Co.                    | 30-inch Universal Mill  | Inter. Spindle, Roll End     |
| 30           | Mark Manufacturing Co.                    | 30-inch Universal Mill  | Inter. Spindle, Pinion End   |
| 48           | Carnegie Steel Co., Duquesne              | 35-inch Blooming Mill   | Leading Spindle              |
| 48           | Mark Manufacturing Co.                    | 35-inch Blooming Mill   | Inter. Spindle, Roll End     |
| 27           | Mark Manufacturing Co.                    | 35-inch Blooming Mill   | Inter. Spindle, Pinion End   |
| 33 1/2       | Mark Manufacturing Co.                    | 28-inch Billet Mill     | Leading Spindle              |
| 27           | Mark Manufacturing Co.                    | 28-inch Billet Mill     | Inter. Spindle, Pinion End   |
| 38           | American Sheet and Tin Plate, Vandergrift | 36-inch Blooming Mill   | Leading Spindle              |
| 27           | American Sheet and Tin Plate, Vandergrift | 36-inch Blooming Mill   | Inter. Spindle, Roll End     |
| 30           | American Sheet and Tin Plate, Vandergrift | 36-inch Blooming Mill   | Inter. Spindle, Pinion End   |
| 48           | Inland Steel Co.                          | 40-inch Blooming Mill   | Leading Spindle              |
| 32           | Inland Steel Co.                          | 40-inch Blooming Mill   | Inter. Spindle, Roll End     |
| 38           | Inland Steel Co.                          | 40-inch Blooming Mill   | Inter. Spindle, Pinion End   |
| 13 1/2       | Inland Steel Co.                          | 40-inch Blooming Mill   | Shear Dep. Table, Side Shaft |
| 33 1/2       | Domination I. & F. Co.                    | 27-inch Universal Mill  | Leading Spindle              |
| 24           | Domination I. & F. Co.                    | 27-inch Universal Mill  | Inter. Spindle, Roll End     |
| 27           | Domination I. & F. Co.                    | 27-inch Universal Mill  | Inter. Spindle, Pinion End   |
| 42           | Lackawanna Steel Co.                      | 28-inch Structural Mill | Leading Spindle              |
| 30           | Lackawanna Steel Co.                      | 28-inch Structural Mill | Inter. Spindle, Pinion End   |
| 13 1/2       | Tata Iron and Steel Co.                   | 40-inch Blooming Mill   | Tilt. Table, Side Shaft      |
| 48           | Tata Iron and Steel Co.                   | 40-inch Blooming Mill   | Leading Spindle              |
| 32           | Tata Iron and Steel Co.                   | 40-inch Blooming Mill   | Inter. Spindle, Roll End     |
| 38           | Tata Iron and Steel Co.                   | 40-inch Blooming Mill   | Inter. Spindle, Pinion End   |
| 27           | Trumbull Steel Co.                        | 36-inch Blooming Mill   | Inter. Spindle, Roll End     |
| 30           | Trumbull Steel Co.                        | 36-inch Blooming Mill   | Inter. Spindle, Pinion End   |
| 48           | Trumbull Steel Co.                        | 36-inch Blooming Mill   | Leading Spindle              |
| 48           | United Steel Co.                          | 35-inch Blooming Mill   | Leading Spindle              |
| 32           | United Steel Co.                          | 35-inch Blooming Mill   | Inter. Spindle, Roll End     |
| 33 1/2       | United Steel Co.                          | 35-inch Blooming Mill   | Inter. Spindle, Pinion End   |
| 33 1/2       | United Steel Co.                          | Lamberton Mill          | Leading Spindle              |
| 24           | United Steel Co.                          | Lamberton Mill          | Inter. Spindle, Pinion End   |
| 38           | United Steel Co.                          | 34-inch Universal Mill  | Inter. Spindle, Pinion End   |
| 27           | Allegheny Steel Co.                       |                         | Leading Spindle              |

It is well worth while pausing to consider the Savings in Mill practice and from the *distress* which you, your men, your neighbors—your whole community—suffer from *absolutely unnecessary Noise*.

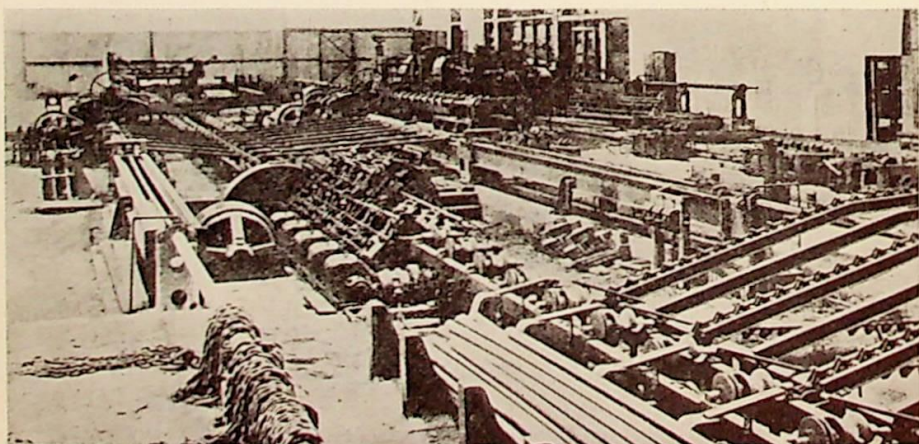
## SOME EXAMPLES OF OUR



Reducing Tube Mill



Lap-Weld Pipe Mill

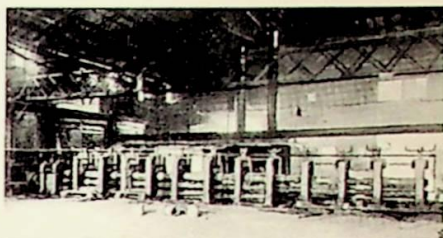


Complete Seamless Tube Mill of our own design and patents

## ENGINEERING AND BUILDING



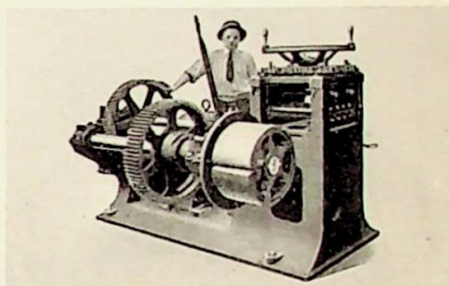
Our Sheet Mills in Japan



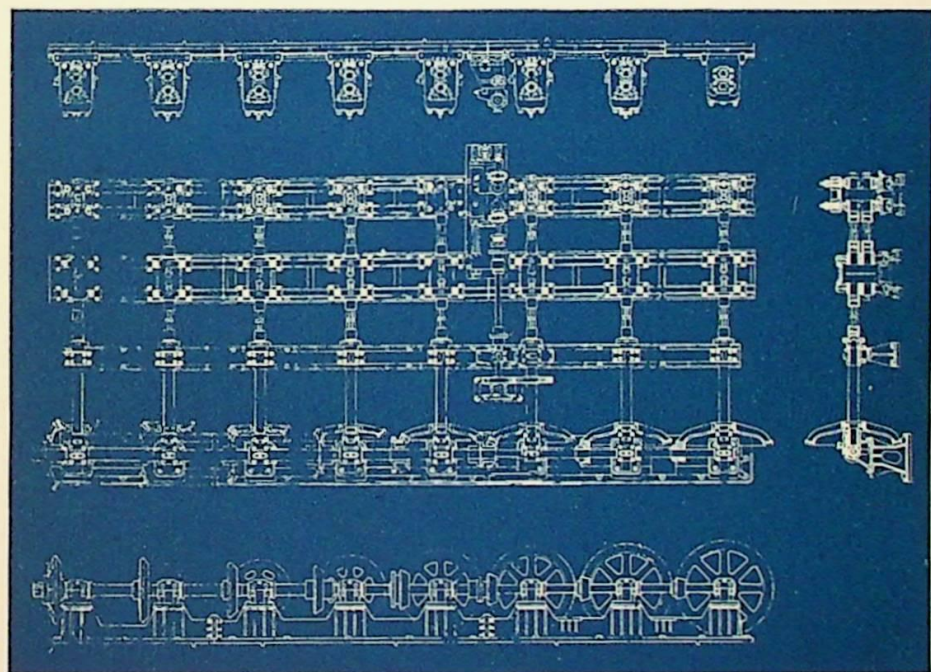
12" Merchant Mill



Cold Strip Mill

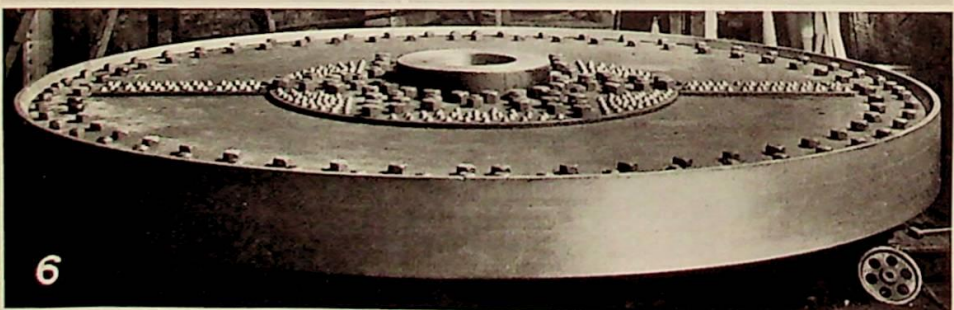
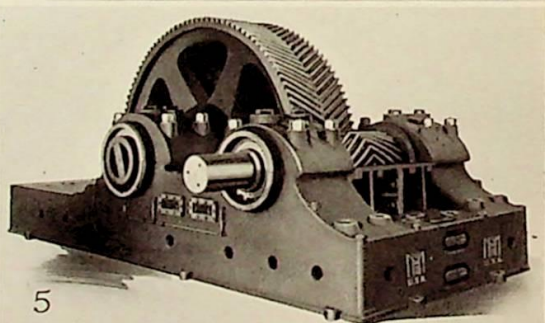
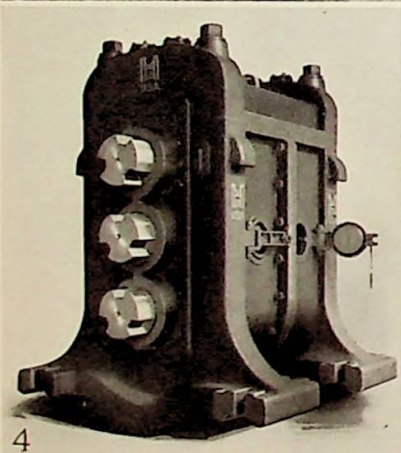
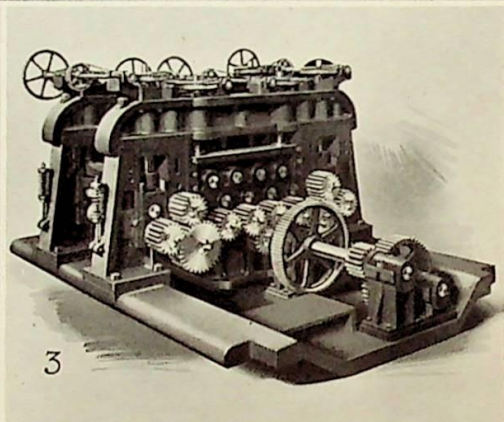
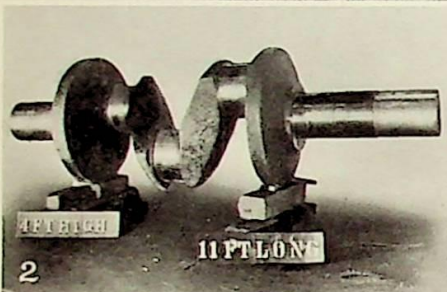
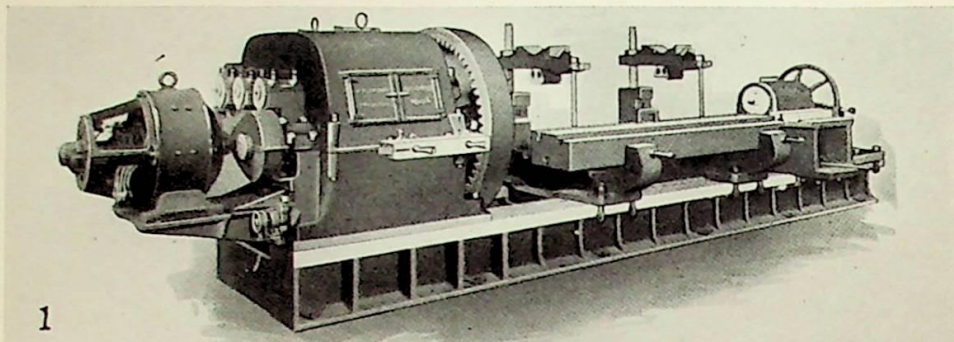


Cold Strip Reeler



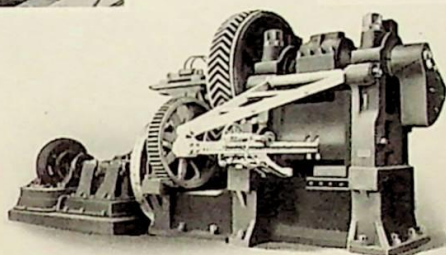
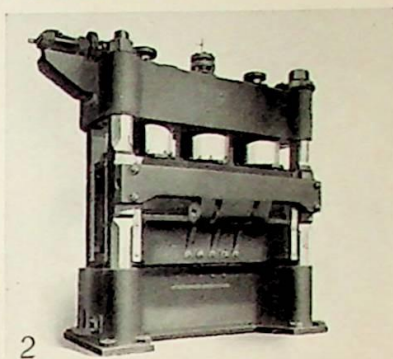
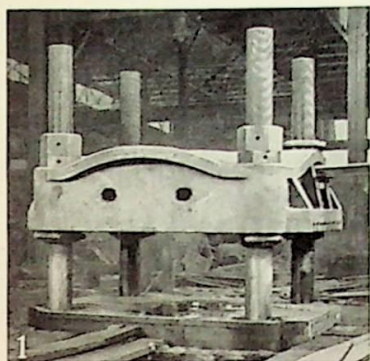
Continuous Mill for Farrell Works, Carnegie Steel Company

## SOME EXAMPLES OF OUR

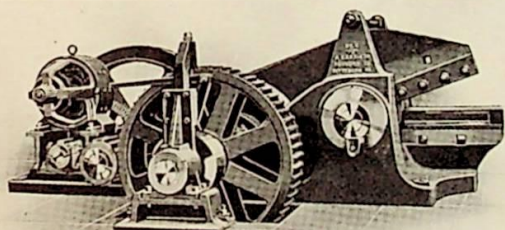


1—Roll Lathe. 2—Crank Shaft. 3—Angle and Beam Straightening Machine. 4—Enclosed Pinion Housing. 5—5000 H. P. Reduction Gear. 6—80-Ton Flywheel, 22-foot diameter.

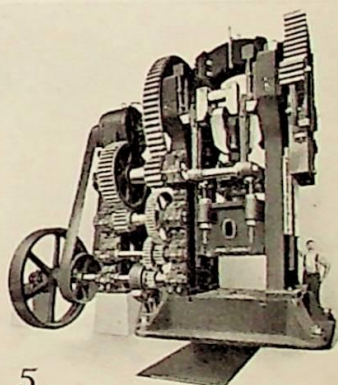
## ENGINEERING AND BUILDING



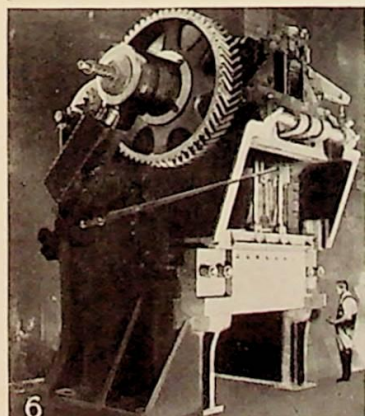
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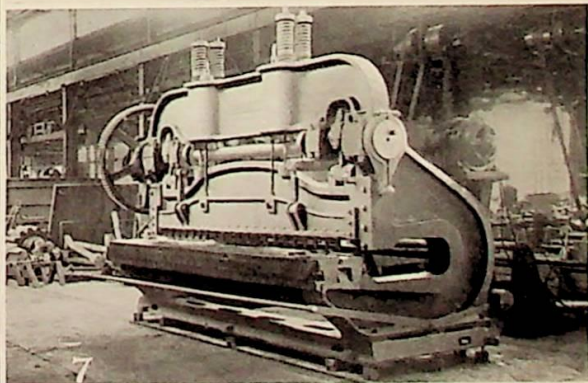
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5

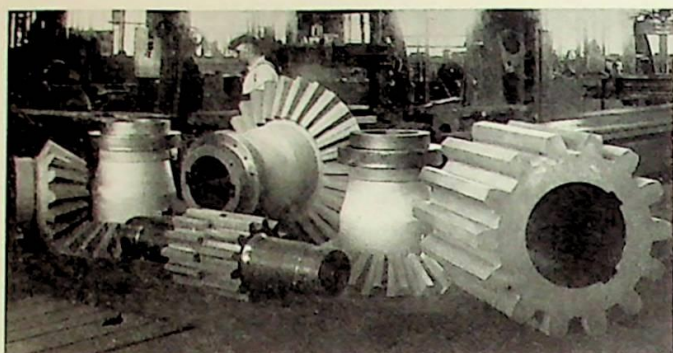


6



7

1—1000-Ton Press. 2—800-Ton Hydraulic Bloom Shear. 3—36" x 8" Hot Bloom Shear. 4—Lever Shear with Clutch. 5—400-Ton Double Acting Press. 6—Sheet Bar Shear, cap. 8 cold bars 8" x 2½". 7—166" Squaring and Slitting Shear.

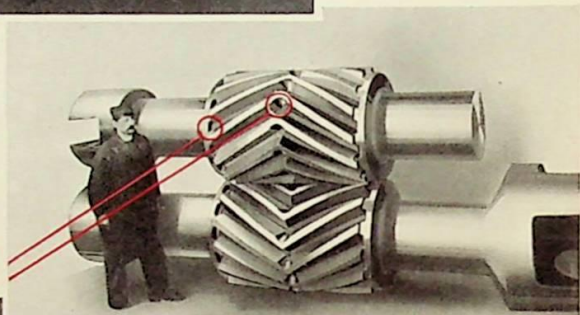


**GEARS**

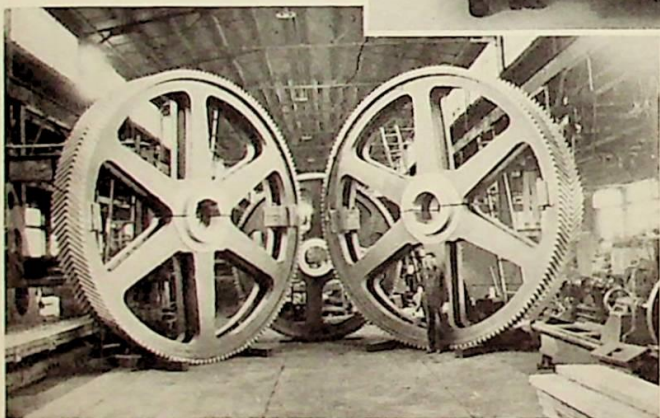
No limitation to thickness of teeth or coarseness of pitch.

**PINIONS**

Note the solid Shroud and Apex



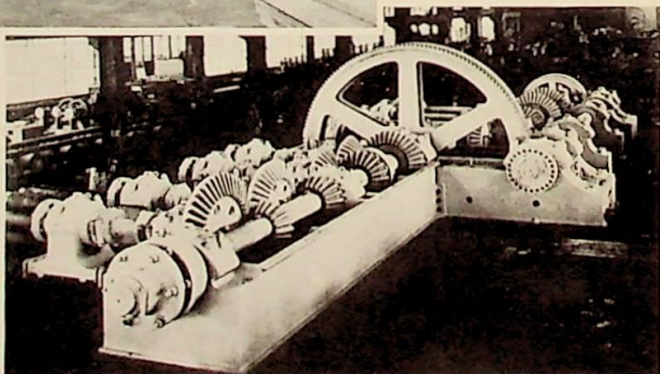
Up to 45 degrees any angle of Helix may be used.



**GEAR  
WHEELS**

We have unequalled facilities for cutting of gears designed to meet the severest conditions of service.

**GEAR  
DRIVES**



Not only are we well equipped to cut bevel, helical and spur gears, but also to design, build, assemble and test the entire drive.

## HELICAL GEARS AND GEAR DRIVES THAT ARE DIFFERENT

**I**N designing helical gears for rolling mill machinery, or for similar service where the peripheral speed is not excessive, but *the power transmitted is large* and the ability to *resist shock* is important, it is highly desirable to use a *coarse pitch* and to maintain a *normal proportion* between the *pitch* and the *width of face*. Increase in pitch and width of face should go hand in hand.

The method employed in the manufacture of gears at our Woodard Plant is *different* and *superior* to the common practice in that it is freed from many of the *usual limitations* and permits the design of gears of the best proportion for the severest service. There is *no limitation* as to the *thickness of the teeth* or *coarseness of pitch*, no practical limitation of width of face. Any angle of helix *up to 45 degrees* may be used, permitting by the *use of the steeper angles*, the design of a *stronger tooth section* and an increased efficiency in the transmission of power. Neither the teeth nor the pinion are *weakened by cutting away* for tool clearance at the *apex of the helix*. The teeth may be reinforced by solid shrouding. *Two double helices* may be combined in one wide face gear making it symmetrical about a center plane at right angles to the axis and *reversible* by turning shaft end for end without changing the mating gear.

*There is much food for thought* in the selection of the best type of Gears and Gear Drives. Our solid apex and solid shroud must appeal to the thoughtful engineer. Our many gear installations and gear drives testify as to the quality of our design and workmanship. We class ourselves, and are known as, Experts in this field of endeavor.

With unequaled facilities for cutting of gears designed to meet the severest conditions of service; with complete control over casting of blanks insuring proper analysis in carbon or alloy steel and suitable heat treatment; with expert and competent designers to study your particular problem; we offer for gears or geared drives—

### ***“The Best in Rolling Mill Machinery”***

In addition to the economy of service from properly cut and mated gears, there is the “*economy of human endurance*” resulting from less noise.

We use the expression—

### ***“NOISELESS ECONOMY”***

*to emphasize all of these savings in wear and tear of men and materials.* We cannot too strongly recommend such savings to the men of the Industries we serve. One of the best savings we all seek is that which helps preserve the human element in Industry. It is the part of wisdom to *stop the noise*. The advantage to yourself and your men will amply repay you.

### **THINK ALSO OF YOUR NEIGHBOR**

## 1875-1922

### WE HAVE PIONEERED—WE HAVE ENGINEERED—WE HAVE BUILT FOR THE NON-FERROUS INDUSTRIES, 156 MILLS IN 47 YEARS

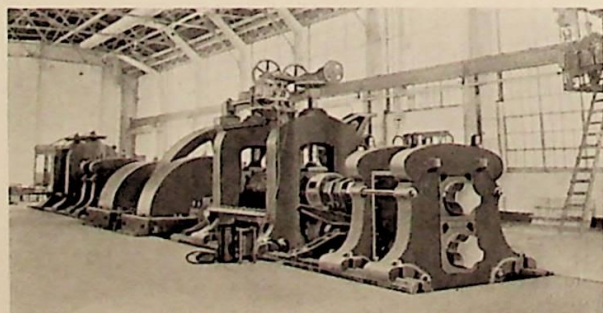
*Emphasizing our intimate knowledge of their requirements*

| Year | Company                                                          | Size, Inch | Kind of Mill |
|------|------------------------------------------------------------------|------------|--------------|
| 1875 | Mineral Point Zinc Co.                                           | 22         | Zinc         |
| 1876 | E. H. Peck                                                       | 10         | Tin Foil     |
| 1876 | E. H. Peck                                                       | 7          | Tin Foil     |
| 1881 | Detroit Copper and Brass Rolling Mills.                          | 24         | Copper       |
| 1881 | Illinois Zinc Co.                                                | 24         | Zinc         |
| 1883 | Pope Cole & Co. (now Baltimore Copper Smelting and Refining Co.) | 20         | Copper       |
| 1884 | Gun Powder Copper Works                                          | 12         | Copper       |
| 1884 | C. G. Hussey Co.                                                 | 20         | Copper       |
| 1886 | C. G. Hussey Co.                                                 | 24         | Copper       |
| 1886 | Bailey Farrell & Co.                                             | 26         | Lead         |
| 1887 | Detroit Copper and Brass Rolling Mills.                          | 22         | Copper       |
| 1887 | Detroit Copper and Brass Rolling Mills.                          | 32         | Copper       |
| 1887 | Wallace & Sons                                                   | 25         | Copper       |
| 1887 | Ansonia Brass and Copper Co.                                     | 16         | Copper Rod   |
| 1887 | Ansonia Brass and Copper Co.                                     | 9          | Copper Rod   |
| 1888 | Chicago Brass Co.                                                | 20         | Brass        |
| 1890 | Wallace & Sons                                                   | 18         | Copper Rod   |
| 1890 | Wallace & Sons                                                   | 9          | Copper Rod   |
| 1892 | Illinois Zinc Co.                                                | 24         | Zinc         |
| 1893 | Pittsburgh Reduction Co. (U. S. Aluminum Co.)                    | 18         | Aluminum     |
| 1894 | T. Ford                                                          | 16         | Copper       |
| 1894 | Pennsylvania Salt Manufacturing Co.                              | 22         | Copper       |
| 1894 | Pittsburgh Reduction Co. (U. S. Aluminum Co.)                    | 21         | Aluminum     |
| 1895 | Pittsburgh Reduction Co. (U. S. Aluminum Co.)                    | 28         | Aluminum     |
| 1899 | Baltimore Copper Smelting and Rolling Co.                        | 25         | Copper       |
| 1899 | Baltimore Copper Smelting and Rolling Co.                        | 22         | Copper       |
| 1899 | Pittsburgh Reduction Co. (U. S. Aluminum Co.)                    | 10         | Aluminum     |
| 1899 | Pittsburgh Reduction Co. (U. S. Aluminum Co.)                    | 28         | Aluminum     |
| 1899 | Hoyt Metal Co.                                                   | 22         | Lead         |
| 1900 | Hendrix Brothers                                                 | 25         | Copper       |
| 1900 | Chicago Brass Co.                                                | 16         | Brass Rod    |
| 1900 | Hoyt Metal Co.                                                   | 22         | Lead         |
| 1900 | Standard Metal Co.                                               | 18         | Silver       |
| 1901 | Illinois Zinc Co.                                                | 24         | Zinc         |
| 1902 | Pittsburgh Reduction Co. (U. S. Aluminum Co.)                    | 26         | Aluminum     |
| 1902 | Lanyon Zinc Co.                                                  | 10         | Zinc         |
| 1902 | Conley Tin Foil Mill                                             | 16         | Tin Foil     |
| 1903 | Pittsburgh Reduction Co. (U. S. Aluminum Co.)                    | 28         | Aluminum     |
| 1904 | Hendrix Brothers                                                 | 30         | Copper       |
| 1904 | Pittsburgh Reduction Co. (U. S. Aluminum Co.)                    | 28         | Aluminum     |
| 1904 | Gould Storage Battery Co.                                        | 16         | Lead         |
| 1905 | C. G. Hussey Co.                                                 | 24         | Copper       |
| 1906 | Pittsburgh Reduction Co. (U. S. Aluminum Co.)                    | 28         | Aluminum     |
| 1907 | Buffalo Copper and Brass Co. (American Copper and Brass Co.)     | 20         | Copper       |
| 1907 | Buffalo Copper and Brass Co. (American Copper and Brass Co.)     | 20         | Copper       |
| 1907 | Buffalo Copper and Brass Co. (American Copper and Brass Co.)     | 26         | Copper       |
| 1907 | Buffalo Copper and Brass Co. (American Copper and Brass Co.)     | 22         | Copper       |
| 1907 | Rome Brass and Copper Co.                                        | 16         | Brass        |
| 1907 | Pittsburgh Reduction Co. (U. S. Aluminum Co.)                    | 20         | Aluminum     |
| 1907 | Handy & Harmen                                                   | 18         | Silver       |
| 1909 | Michigan Copper and Brass Co.                                    | 18         | Brass        |
| 1909 | U. S. Aluminum Co.                                               | 28         | Aluminum     |

| Year | Company                                           | Size, Inch | Kind of Mill |
|------|---------------------------------------------------|------------|--------------|
| 1909 | U. S. Aluminum Co.                                | 21         | Aluminum     |
| 1910 | Michigan Copper and Brass Co.                     | 22         | Brass        |
| 1910 | Detroit Copper and Brass Co.                      | 20         | Brass        |
| 1911 | C. G. Hussey & Co.                                | 10         | Copper       |
| 1911 | Baltimore Copper Smelting and Rolling Co.         | 21         | Copper       |
| 1911 | U. S. Light and Heating Co.                       | 16         | Lead         |
| 1911 | John J. Crooke Co.                                | 8          | Tin Foil     |
| 1911 | Baker & Co.                                       |            | Platinum     |
| 1912 | Taunton-New Bedford Copper Co.                    | 20         | Copper       |
| 1912 | Taunton-New Bedford Copper Co.                    | 22         | Copper       |
| 1912 | Taunton-New Bedford Copper Co.                    | 24         | Copper       |
| 1912 | U. S. Aluminum Co.                                | 28         | Aluminum     |
| 1913 | Bridgeport Brass Co.                              | 18         | Brass        |
| 1913 | Bridgeport Brass Co.                              | 22         | Brass        |
| 1913 | U. S. Aluminum Co.                                | 28         | Aluminum     |
| 1913 | Standard Aluminum Co. (Aluminum Goods Co.)        | 26         | Aluminum     |
| 1913 | Standard Aluminum Co. (Aluminum Goods Co.)        | 21         | Aluminum     |
| 1913 | Aluminum Goods Manufacturing Co.                  | 24         | Aluminum     |
| 1913 | Matthiessen & Hegeler Zinc Co.                    | 14         | Zinc         |
| 1913 | United Lead Co.                                   | 18         | Lead         |
| 1913 | Handy & Harmen                                    | 18         | Silver       |
| 1914 | Cleveland Metal Products Co.                      | 28         | Aluminum     |
| 1914 | Cleveland Metal Products Co.                      | 28         | Aluminum     |
| 1914 | U. S. Aluminum Co.                                | 28         | Aluminum     |
| 1914 | U. S. Aluminum Co.                                | 21         | Aluminum     |
| 1915 | Seymour Manufacturing Co.                         | 22         | Copper       |
| 1915 | Dominion Copper Products Co.                      | 22         | Copper       |
| 1915 | Bristol Brass Co.                                 | 20         | Brass        |
| 1915 | Seymour Manufacturing Co.                         | 20         | Brass        |
| 1915 | Bristol Brass Co.                                 | 20         | Brass        |
| 1915 | Buffalo Copper and Brass Co. (American Brass Co.) | 20         | Brass        |
| 1915 | Buffalo Copper and Brass Co. (American Brass Co.) | 20         | Brass        |
| 1915 | Buffalo Copper and Brass Co. (American Brass Co.) | 20         | Brass        |
| 1915 | Chase Metal Works                                 | 20         | Brass        |
| 1915 | Chase Metal Works                                 | 16         | Brass        |
| 1915 | Societe Metallurgical Italiano                    | 26         | Brass        |
| 1915 | Riverside Metal Co.                               | 20         | Brass        |
| 1915 | Riverside Metal Co.                               | 18         | Brass        |
| 1915 | Bristol Brass Co.                                 | 20         | Brass        |
| 1915 | Buffalo Copper and Brass Co. (American Brass Co.) | 20         | Brass        |
| 1915 | Buffalo Copper and Brass Co. (American Brass Co.) | 20         | Brass        |
| 1915 | Dominion Copper Products Co.                      | 22         | Brass        |
| 1915 | Waclark Wire Co.                                  | 16         | Brass Rod    |
| 1915 | Aluminum Goods Manufacturing Co.                  | 26         | Aluminum     |
| 1915 | L'Aluminum Francais (France)                      | 30         | Aluminum     |
| 1915 | Matthiessen & Hegeler Zinc Co.                    | 26         | Zinc         |
| 1915 | Matthiessen & Hegeler Zinc Co.                    | 22         | Zinc         |
| 1916 | Bristol Brass Co.                                 | 12         | Copper       |
| 1916 | C. G. Hussey & Co.                                | 24         | Copper       |
| 1916 | C. G. Hussey & Co.                                | 20         | Copper       |
| 1916 | C. G. Hussey & Co.                                | 12         | Copper       |
| 1916 | Bristol Brass Co.                                 | 16         | Brass        |
| 1916 | Bristol Brass Co.                                 | 14         | Brass        |
| 1916 | Bristol Brass Co.                                 | 20         | Brass        |
| 1916 | Buffalo Copper and Brass Co. (American Brass Co.) | 14         | Brass        |
| 1916 | Detroit Copper and Brass Co.                      | 10         | Brass        |
| 1916 | Westinghouse Church Kerr Co.                      | 20         | Brass        |
| 1916 | Browns Copper and Brass Co.                       | 16         | Brass        |
| 1916 | Browns Copper and Brass Rolling Mills             | 16         | Copper Rod   |
| 1916 | Browns Copper and Brass Rolling Mills             | 16         | Brass Rod    |

| Year | Company                                                     | Size, Inch | Kind of Mill |
|------|-------------------------------------------------------------|------------|--------------|
| 1916 | Societe Metallurgical Italiano, Italy                       | 18         | Brass Rod    |
| 1916 | Bremer Waltz Corporation (Aluminum Goods Manufacturing Co.) | 21         | Aluminum     |
| 1916 | Mitsui & Co.                                                | 10         | Lead         |
| 1917 | Taunton-New Bedford Copper Co.                              | 24         | Copper       |
| 1917 | Taunton-New Bedford Copper Co.                              | 24         | Copper       |
| 1917 | Taunton-New Bedford Copper Co.                              | 20         | Copper       |
| 1917 | Taunton-New Bedford Copper Co.                              | 22         | Copper       |
| 1917 | Westinghouse Machine Co.                                    | 12         | Copper       |
| 1917 | Cleveland Brass and Copper Co.                              | 18         | Brass        |
| 1917 | Cleveland Brass and Copper Co.                              | 14         | Brass        |
| 1917 | Cleveland Brass and Copper Co.                              | 22         | Brass        |
| 1917 | Waydock Wire Co.                                            | 22         | Brass        |
| 1917 | Bristol Brass Co.                                           | 20         | Brass        |
| 1917 | Cleveland Brass and Copper Co.                              | 18         | Brass Rod    |
| 1917 | Bremer Waltz Corporation (Aluminum Goods Manufacturing Co.) | 21         | Aluminum     |
| 1917 | Mitsui & Co.                                                | 24         | Zinc         |
| 1917 | American Zinc Products Company                              | 26         | Zinc         |
| 1917 | American Zinc Products Company                              | 24         | Zinc         |
| 1919 | West Virginia Metal Products Co.                            | 20         | Brass        |
| 1919 | West Virginia Metal Products Co.                            | 22         | Brass        |
| 1919 | Dallas Copper and Brass Co.                                 | 12         | Brass        |
| 1919 | U. S. Aluminum Co.                                          | 28         | Aluminum     |
| 1919 | U. S. Aluminum Co.                                          | 28         | Aluminum     |
| 1919 | U. S. Aluminum Co.                                          | 28         | Aluminum     |
| 1919 | U. S. Aluminum Co.                                          | 21         | Aluminum     |
| 1919 | H. H. Plummer Co.                                           | 16         | Lead         |
| 1919 | H. H. Plummer Co. (India)                                   | 10         | Tin Foil     |
| 1919 | Midland Metal Co.                                           | 8          | Tin Foil     |
| 1919 | Midland Metal Co.                                           | 16         | Tin Foil     |
| 1920 | West Virginia Metal Products Co.                            | 24         | Copper       |
| 1920 | West Virginia Metal Products Co.                            | 24         | Copper       |
| 1920 | West Virginia Metal Products Co.                            | 26         | Copper       |
| 1920 | West Virginia Metal Products Co.                            | 24         | Copper       |
| 1920 | Baltimore Tube Co.                                          | 20         | Brass        |
| 1920 | Baltimore Tube Co.                                          | 22         | Brass        |
| 1920 | Westinghouse Electric and Manufacturing Co.                 | 12         | Brass        |
| 1920 | West Virginia Metal Products Co.                            | 18         | Copper Rod   |
| 1921 | Harrison Radiator Corporation                               | 16         | Brass        |
| 1922 | Western Cartridge Co.                                       | 24         | Brass        |
| 1922 | Western Cartridge Co.                                       | 22         | Brass        |
| 1922 | Western Cartridge Co.                                       | 20         | Brass        |
| 1922 | Western Cartridge Co.                                       | 18         | Brass        |
| 1922 | Aluminum Goods Manufacturing Co.                            | 26         | Aluminum     |
| 1922 | Aluminum Goods Manufacturing Co.                            | 28         | Aluminum     |

AN AVERAGE OF OVER THREE OF ABOVE LISTED MILLS EVERY YEAR  
AN ENVIABLE RECORD



Motor-Driven  
Aluminum  
Mill

## 1823-1924

### OVER ONE HUNDRED YEARS OF ROLL MAKING

**T**HE HONORABLE JOSEPH BUFFINGTON in a very able opinion makes this very competent analysis of the relationship of rolls to the rolling mill and its operation:—

*"The roll is the heart of the rolling mill. In iron and steel work, the roll is the place where all that is highest in heat, greatest in power, and most intense in strain centers."*

*While the roll stands the strain, the mill goes; when it breaks, the mill closes."*

—Quotation from Record 248, Federal Reporter P. 705

### "THE ROLL IS THE HEART OF THE ROLLING MILL"

We wish to emphasize our technical position as producers of Rolls for every kind of use in both the Ferrous and Non-Ferrous Industries to meet the requirements of this definition of rolls.

### OUR "ADAMITE" AND "MANGANITE" ROLLS COVER THE ALLOY FIELD

No service requirements are too severe for them.

### OUR STEEL ROLLS OF VARIOUS CARBONS AND MIXES, INCLUDING NICKEL STEEL ROLLS

to suit the best judgment of our customers.

### OUR SAND IRON ROLLS OF KNOWN CONSTITUENTS

to meet the most exacting conditions for their class of service.

### OUR CHILLED ROLLS MADE WITH HIGHEST DEGREE OF METALLURGICAL AND MECHANICAL CARE AND PRECISION

Our Experience and Reputation in this branch of the art date from 1823, when we made the first roll West of the Alleghenies. We made use of Harley's patent of 1835 until its expiration. We made the first Chilled Rolls for rolling brass in the United States in 1842. We first made the largest Chill Roll ever used, in 1908.

Is it any wonder, that with the mountains of rolls we have produced over this long period of time, we are able and competent to meet any rolling problem—no matter of how difficult a character?

Our several types of rolls have done their full share to maintain our position as

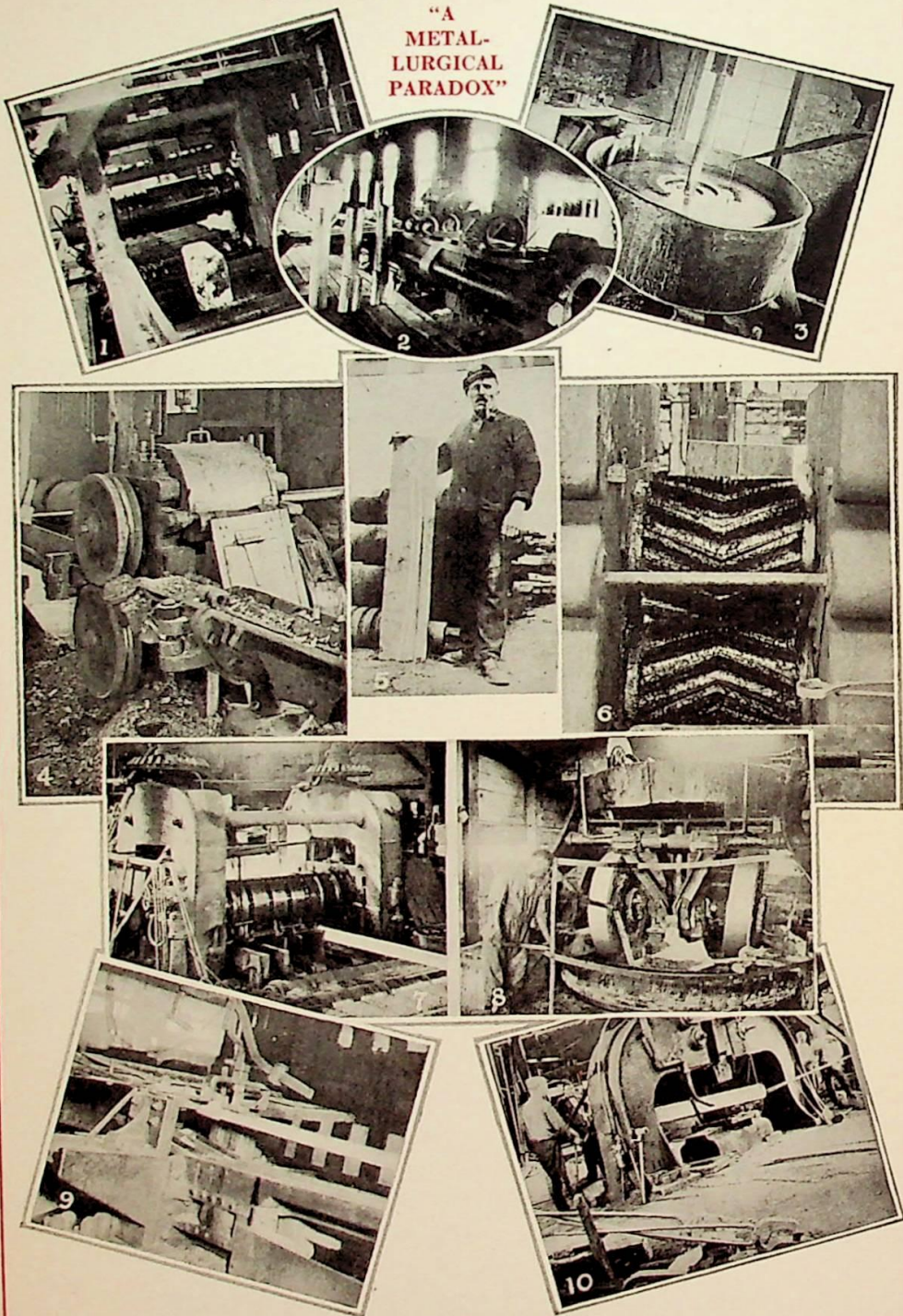
**"PIONEERS, ENGINEERS AND BUILDERS" of**

**"THE BEST IN ROLLING MILL MACHINERY"**

**FOR THE IRON AND STEEL AND NON-FERROUS INDUSTRIES**

# ADAMITE IN SERVICE

"A  
METAL-  
LURGICAL  
PARADOX"



1—Blooming-Mill Rolls. 2—Drawing Rings. 3—Glass Grinding Disc. 4—Welding Rolls, Pipe Mill. 5—The Tie Plate Roller let go of His Tongs. 6—Rolling Mill Pinions. 7—Heavy Bar-Mill Rolls. 8—Sand and Clay Mill Tires. 9—Skelp Bending Dies, Pipe Mill. 10—Heavy Hammer Dies for Forging Alloy Steel.



## SERVICE IN THE WORLD'S WORK—

**P**IONEERING pays only when the reward sought is obtainable. The history of the development of every meritorious invention and new idea tells the tale of the pioneer; first, as to the doubt and distrust which a radically new thing necessarily stimulates in one's mind; and second, of the suspicion and criticism felt and offered by nearly everybody who claims to be a competent judge. Yet each one of the successful products of the inventor, having passed through this pioneer period, at length comes to be recognized as the best and most adaptable for the purpose intended, and the most efficient for their particular uses.

**P**ROGRESSIVELY, Adamite has been developed with the idea of making it easier to perform certain operations in the industries and insuring a better product and greater production in a more economical way.

**T**HE Progressive industrial world has profited by the use of Adamite, but few realize in how many different ways Adamite can be used advantageously. We are all prone to overlook the obvious when seeking the solutions of our problems. It is with this thought in mind that we reproduce these photographs of Adamite performing its part in the world's work.

**T**HERE is no secret in Adamite other than its dependable service. The chemical composition of the alloy is probably a matter of record in the leading iron and steel laboratories in this country and in Europe. It is well known that the amount of carbon in the alloy is extremely high, relative to steel, and in cases approaches the ranges of carbon in cast iron products.

**B**OTH the present and past state of the art and Adamite's relation to it was fully disclosed and set forth in the suit to uphold the patent.

**W**HEN the case was argued before the Federal Court of Appeals, the very homely expression of comparing Adamite to a bridge connecting the iron group and the steel group of products was used. It was a very convincing argument. It was made plain to the Court that dependence upon the effect of the carbon in the alloy gave it great resistance to wear and abrasion. The diamond, the purest form of carbon known, will cut glass, one of the hardest materials we have to deal with in commerce; but the diamond has hardness and toughness of a quality which insures its preserving its form as well as its keen cutting edge.

It is all simple enough as we see it today in the various places in which Adamite is making extraordinary performance records.

**T**HE Honorable Judges of the Court of Appeals, to whom the case was presented, termed Adamite "A Metallurgical Paradox."

### "A NEW METAL"

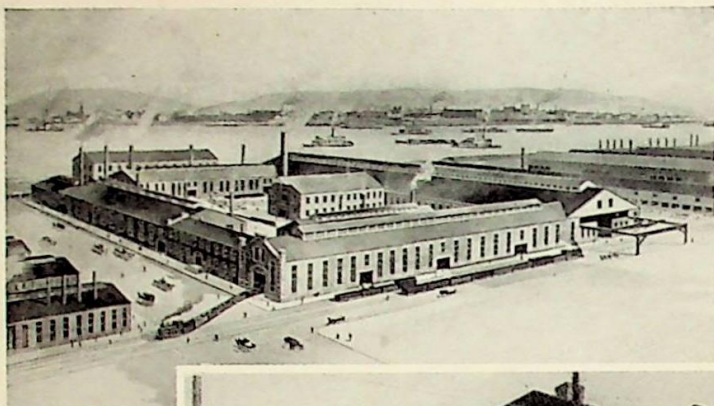
The court said: "When we speak of Adamite as a new metal, we mean new in the sense of being different from, not merely a variation of, an old metal, as steel differs from cast iron."

### "ITS CARBON CONTENT"

They further stated: "The striking thing of central characteristic in the chemistry of the patent alloy is its carbon content, both as to quantity and form. In quantity it lies well within the range of cast iron, but in form it is that of steel."

**A**FTER the most thorough inquiry and exhaustive tests, the *Best men*, in the *Best mills* and the *Best factories* have agreed that Adamite is the *Best material* for dependable service and greatest economy of performance.

**A**DAMITE has won the highest praise, not only from one of our highest courts, but also from the highest type of men represented in our industries.



Fort Pitt  
Works



Garrison Foundry



Midland Steel  
Foundry



Wooster Plant

### YEARLY CAPACITIES

|                                                  |                 |
|--------------------------------------------------|-----------------|
| Machining . . . . .                              | 915,600 Hours   |
| Gear Cutting Machines . . . . .                  | 83,500 Hours    |
| Roll Turning and Finishing . . . . .             | 384,000 Hours   |
| Total . . . . .                                  | 1,383,100 Hours |
| Steel and Alloy Rolls and Castings . . . . .     | 36,000 Tons     |
| Grey Iron Rolls and Castings (Cupola) . . . . .  | 60,000 Tons     |
| Chill Rolls and Castings (Air Furnace) . . . . . | 15,000 Tons     |
| Brass and Bronze Castings . . . . .              | 1,500 Tons      |
| Total . . . . .                                  | 112,500 Tons    |

1924

## MACKINTOSH-HEMPHILL Co. ORGANIZATION

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### *Directors*

|                |               |                 |
|----------------|---------------|-----------------|
| G. W. BAUM     | D. H. BAUM    | H. V. BLAXTER   |
| JOS. E. FAWELL | PENNOCK HART  | CHAS. McKNIGHT  |
| G. E. PAINTER  | J. McK. SPEER | J. RAMSEY SPEER |

### *Executive Officers*

|                 |                                                |
|-----------------|------------------------------------------------|
| J. RAMSEY SPEER | President                                      |
| JOS. E. FAWELL  | Vice-President                                 |
| JOHN H. BODE    | Vice-President                                 |
| H. V. BLAXTER   | General Counsel                                |
| D. H. BAUM      | Secretary and Assistant Treasurer              |
| JAMES C. McFEE  | Assistant Secretary and Assistant to President |
| C. HOWARD PAUL  | Comptroller and Auditor                        |
| J. CRANSTON FIX | Chief Clerk                                    |
| F. K. ACKER     | Purchasing Agent                               |

### *Sales and Engineering*

|                             |                           |
|-----------------------------|---------------------------|
| Vice-President, (in charge) | Assistant Sales Managers, |
| JOS. E. FAWELL              | E. C. B. GOULD            |
| Roll Sales,                 | S. R. WILLOCK             |
| H. A. LOMAX                 | Assistant Chief Engineer, |
| F. GRIFFITHS                | W. L. DITGES              |
| J. F. McCORRY               | Chief Estimator,          |
| Gear Sales,                 | C. V. WILT                |
| C. A. REESE                 | Chief Draftsman,          |
| "Adamite" Sales,            | L. G. PEARCE              |
| J. R. PATTERSON             | Advertising,              |
| R. T. RICHARDS              | L. C. AMMAN               |

### *Operations*

|                                 |                                      |
|---------------------------------|--------------------------------------|
| Vice-President, (in charge)     | Plant Superintendents,               |
| JOHN H. BODE                    | Fort Pitt—H. G. SMYERS               |
| Assistant to Vice-President,    | Garrison—M. F. ENSSLIN               |
| ALDEN H. BAUM                   | Midland—B. F. PARLETT, Jr.           |
| Gen'l Sup't, Pittsburgh Plants, | Wooster—H. D. KUTHE                  |
| SAMUEL McMILLEN                 | Production Department,               |
| Manager, Wooster Plant,         | ALCwyn JONES                         |
| H. B. HATTON                    | Order Department,                    |
|                                 | C. L. WYLIE                          |
|                                 | Metallurgical Department, G. M. SHAW |

MAY 8 1925



*"The Best In Rolling Mill Machinery"*



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